I/O News

New C-10 Department: Close Encounters

Formatted Input Routine for 32K

proBOOKS: A Software Review

THE OFFICIAL PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF CROMEMCO USERS

Volume Three, Number Six

Single Copy Price $7.50

Cromemco Systems Network Transactions at Chaotic Exchange

60 System Twos Handle 100,000+ Deals Daily at CME

by Gary W. Breeding, CBC

To the casual observer, the activity level at the Chicago Mercantile Exchange is, at best, confusing and chaotic. At worst, it's insanity in motion. When the opening bell sounds at 9:00 a.m., two thousand people jam themselves into groups on the exchange gloor and spend the next five hours yelling, screaming, and running. Papers fly. Throats become hoarse. Phone lines buzz. Walkie-talkies squawk out from everywhere. The slowest pace is run. Ulcers abound and Di-Gel tablets are in abundant use.

When the bell sounds again at 2:00 p.m., well over 100,000 contracts will have been written. A financial exchange affecting all walks of life—doctors, lawyers, professors, brokers, housewives, farmers—will have taken place. Insurance companies, mutual funds, and major corporations also feel the effects of each day's activity.

The truth about this scene, of course, is that the apparent chaos is extremely well-controlled, and the players very well-informed. They draw on experience, wits and knowledge—as well as mountains of data—to make the instant decisions that shift billions of dollars within the world's economy daily.

Under the frantic trading floor of

Continued on page 20

An overview of the floor of the Chicago Mercantile Exchange where this level of frenzied activity occurs for five hours daily.

WHAT IS SUDS AND WHO NEEDS IT?

We often receive calls or letters from Members asking our opinion of Cromemco's **Software Update Service** which carries the acronym, **SUDS**. SUDS costs $95.00 per year (U.S.) per software package registered (or subscribed). It offers the subscriber updates on each new version of the registered software released during the SUDS subscription year. It is a function of the Customer Service Department, headed by John Hulten, to keep a separate mailing list of all current SUDS registrations and **automatically** ship the new releases to current subscribers.

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C-10 Users

NEW SOFTWARE FOR THE C-10

Cromemco announced several new software packages for its C-10 personal computer, updates for several of its existing packages, and a major new release of the C-10 operating system, called Release 5, which will be available this spring.

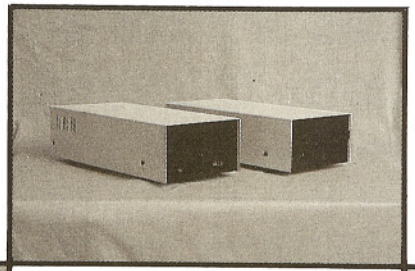
Some of the most popular industry-standard CP/M software has now been ported to the C-10 and is available from Cromemco. These packages now include Ashton Tate's dBASE II and Sorcim's SuperCalc 2. In addition MicroPro's WordStar, CalcStar, MailMerge, and InfoStar are also available for the C-10

Continued on page 8

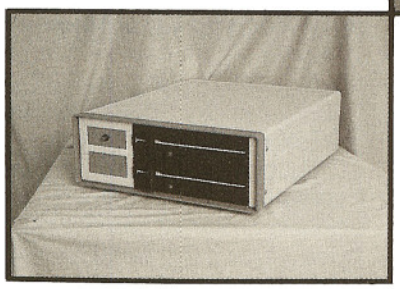
DISK DRIVE SUBSYSTEMS

THE SOLUTION TO DISK STORAGE PROBLEMS

16 MB 5¼" Hard Disk



5¼" Stand-alone



CDC Phoenix and Lark Subsystems
(not shown)

8" Subsystem Matches System One

8" Combination Pack

Disk Subsystems from the Butler-Griffith Group require ***no hardware modifications.*** *Sixteen megabyte, five-inch subsystem for CROMIX*, stand-alone five-inch floppy systems, eight-inch drive subsystems to match the System One, and combination packs contain up to four, eight-inch slimline drives or, combined eight-inch drives and sixteen megabyte Winchester subsystems.*

* CROMIX is registered trademark of Cromemco, Inc.

FEATURES

All Floppy Disk Subsystems offer Double-sided, Double-density Storage. CDC Phoenix offers 96MB of storage. The 16MB Lark Drive has 8MB fixed and 8MB removable. The 96MB Subsystem has 16MB removable cartridges.

You choose the configuration best suited to your needs.

In rackmount versions . . .
Dual rackmount 8" drives . . . quad 8" rackmount . . . a single 8" drive . . . or an 8" drive matched with a 16MB 5¼" Winchester. Rackmount versions are also available with attractive, solid walnut dress sides for tabletop use.
In tabletop versions . . .
We offer stand-alone 5¼" subsystems designed for the user who has no 5¼" drive, or requires an additional 5¼" drive—Double-sided, Double-density. Stand-alone 5¼" drive and dual half-size drives are available.
Our 8" tabletop package matches the Cromemco System One cabinet. The subsystem can be ordered with a single, Double-sided, Double-density drive or with dual drives.

No modifications to the floppy disk controller are required.

Our interface card inside the cabinet assures compatibility with the Cromemco 16FDC.

Drive Manufacturers Represented . . .

Eight-inch drives from Mitsubishi Electric and Qume; half-eight(8"& 5¼") drives from Qume and Tandon.

Eight-inch Drive Specifications

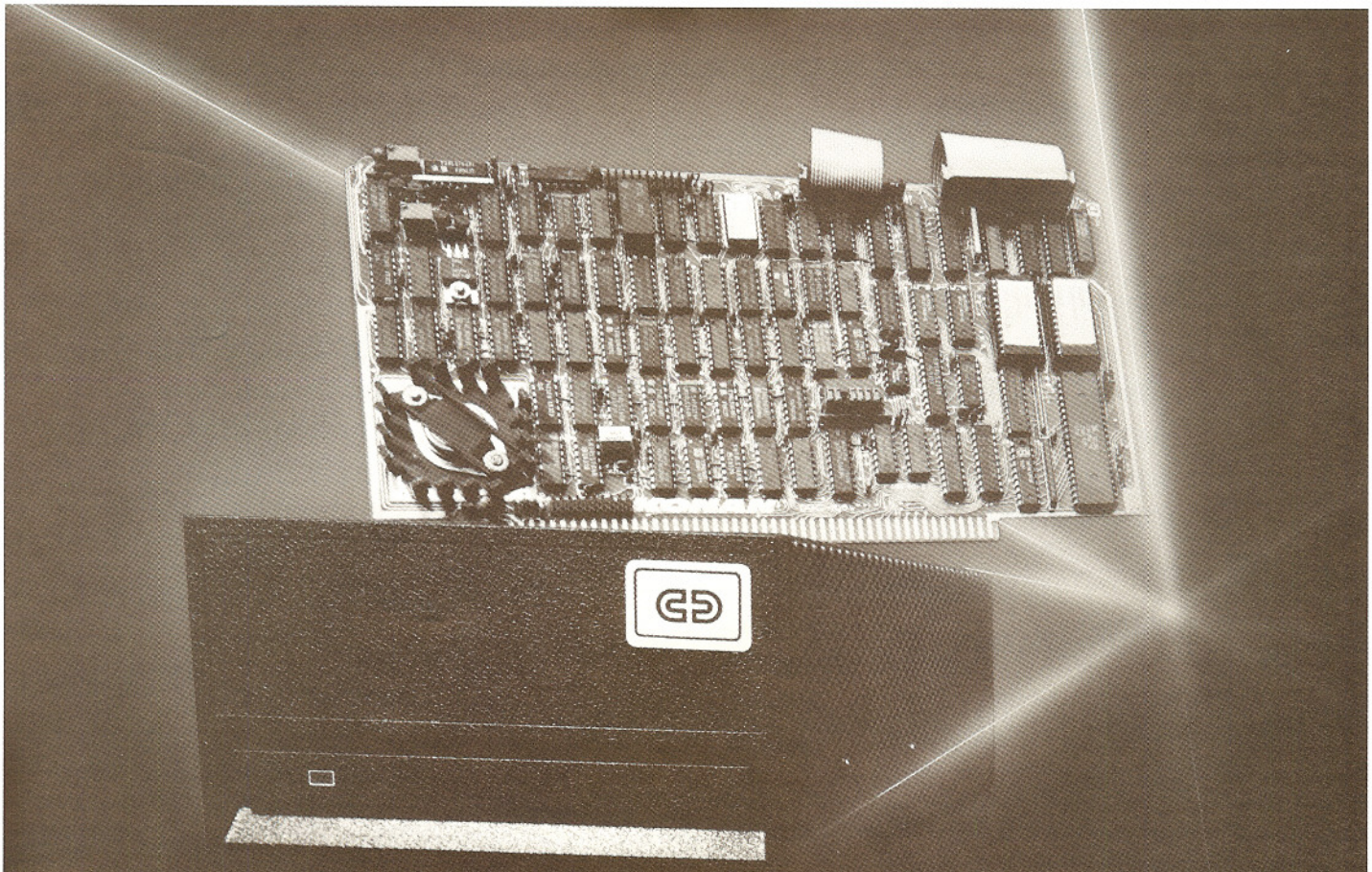
3 ms track-to-track
Average access time, including head settling time: 91ms
Transfer rate: 500KBPS
Formatted capacity: 1.2 megabytes
Recording method: FM single-density; MFM double-density

We also offer 10MB, 5¼" Winchesters for use with CROMIX systems.

Five-inch Winchester Drives have the following specifications:

Unformatted capacity: 16 megabytes
Recording Surfaces: 3
Recording heads: 6
Rotational rate: 3600 rpm
Transfer rate: 5Mbits per second
Seek time: 125 milliseconds (average)
To order, contact:

Royal Data, Inc.
2199 Garden Street
P.O. Box 2745
Titusville, FL 32780
(305)267-1960 or 894-7641



The Hard Disk That's Hard To Believe

35 Megabytes/35 Milliseconds

Introducing the Performance Solution for your Cromemco CROMIX System 1,* System 2 or System 3.* 35 Megabytes of hard disk storage with 35 millisecond average access time.

Complete Package Includes:

- Control Data Corporation Hard Disk
- Disk Controller
- System Generation program
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- Efficient disk I/O drivers provide additional shell buffers
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- One Year Warranty (EXPRESS Maintenance Service Available)

This new 35 Megabyte Hard Disk Subsystem is available only from **Gunn Enterprises, Inc.**

$3,995.*

Dealer Inquiries Invited.

The Cromemco Specialists

Gunn Enterprises, Inc.
5615 Richmond, Suite 150
Houston, TX 77057
713/781-6911

*Configurations for CS-0, CS-1, CS-1H, CS-3, and Z-2H vary from $3995. to $4495.

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January/February, 1984 Volume Three, Number Six

I/O News

The Official Publication of The International Association of Comemco Users is available through membership in the association. Editorial and advertising policies are designed for the enlightenment of the members in regard to new uses for, and developments of, Cromemco products and other products compatible with Cromemco systems.

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Looking for Statistics Software
Editor:

I am a researcher from Cardiovascular Institute in Guangdong, People's Republic of China, and now study and research as a visiting scholar at Northwestern University Medical School in Chicago.

Our institute has a System Three with the 3102 terminal. While in the U.S., we are going to buy a few statistics software packages such as BMDP, SAS, SPSS, and others in addition to Cromemco's StatMaster.

I would greatly appreciate it if you will forward some information as to what statistics packages can or can't run on our computer, as

input...

well as some details about StatMaster.
Yours truly,
Liao, Youlian
Dept. of Community Health & Preventive Medicine
Northwestern University Medical School
303 E. Chicago Avenue
Chicago, IL 60611

Dear Sir:

We have no expertise in statistics software, but perhaps some other members do. Your letter listed several packages that are new to us, except for StatMaster. We know that many users have been working with StatMaster since its release and maybe they can provide specifics about it.

We ran "statistics" through **I/O Archives** and found several references. In "bits & bytes..." of Vol. I, No. 4, we found a package recommended by Professor Donald Runnels of the University of Colorado. He mentioned that it is "...a very extensive and sophisticated statistics package that runs nicely, without any modifications, under CDOS." The product is **Microstat** and is obtainable from a company called Ecosoft, P.O. Box 68602, Indianapolis, IN 46268.

Again in "bits & bytes...," this time in Vol. II, No. 4, we found a reference to **ABSTAT** by Anderson-Bell Co. of Denver, Colorado. Sorry, no address listed, but we have seen this package advertised in several computer magazines.

A third reference appeared in "input..." of Vol. II, No. 5, this time for **IFDAS**, an acronym for Interactive Forecasting and Data Analysis System. IFDAS has also been advertised in I/O News and is available from The Software Hill, 1857 Apple Tree Lane, Mt. View, CA 94040.

We hope this information helps you in your search, and would appreciate your input as to the value of any of these products.
Editor

Problems with CP/M Simulation
Editor:

I have a complaint that I would like to air to see if others share the same concern. As a percentage of sales (we are Cromemco dealers), 75% of our activity is with customers who buy a Cromemco computer as a **general purpose** system. As such, it requires general purpose applications software. Today, our choice is most often selected from some of the excellent CP/M programs available. However, more and more of these programs are unable to run on CROMIX systems. Why? Well, we have discovered two, major reasons.

First, system call 1FH is not implemented in the CROMIX **sim.bin** program. Granted, it may be difficult to supply the correct information back to the calling program for this call, but SOMETHING should be returned rather than aborting the program.

The second area of concern is with the inability of the operating system to deal with characters which are illegal in CROMIX, but legal under CP/M. There is no apparent reason why sim.bin cannot scan this file and replace the characters prior to actually using the file names.

Now, I have always believed that if one is going to complain, a solution should also be offered. First, I would like to see three, different simulators: CP/M, CDOS, and MP/M. The reason for this is that these three operating systems have inherent conflicts in the upper system calls. By separating them, the user could decide which simulator to use. You will notice I included MP/M. That is because most of our customers want to buy multi-user applications software, the majority of which seems to be written in CB-80 which has the LOCK and UNLOCK statements. In the present situation, the MP/M system calls are in conflict with the CDOS calls.

I would be interested in hearing other comments in regard to operating system conflicts. Cromemco may share my interest.
Mark M. Byrd
MCS, Microcomputer Consulting Services
Richardson, Texas
(214) 699-7783

Dear Mark:

I think you're right. Cromemco has been interested in this area for some time. In fact, the latest versions of CROMIX (11.24 & 20.61) contain a new simulator which allows the vast majority of CP/M programs to run without a hitch. The exceptions, as you noted, will occur with programs that were written in CB-80. We understand that the simulator from Gunn Enterprises in Houston, Texas, was recently revised to address that particular problem. Contact Robert Gunn for verification at (713) 781-6911.
Editor

More Suggestions
Editor:

Thank you for publishing my letter (re: SuperCalc mis-operating under CDOS 2.56) in Vol. III, No. 5. Evidently someone at Cromemco already knew of the problem, as it was cured with the installation of CDOS 2.58.

Here is another thought for you. Several Cromemco-specific publications are now available (e.g. **An Introduction to Cromemco's 32K Structured BASIC** by Wayne Watson, and **CROMIX—A User's Guide** by Leigh R. Thomas). I suggest I/O News print a listing of titles, prices, and from whom to obtain such books. If I/O news reviews the book, also print the volume and issue in which reviewed.

By the way, I miss the listing of

Continued on page 20

Look at Your Label

A new feature was added to the address label program a few issues ago. It shows up on the label attached to the envelope containing I/O News as *R-1, *R-2, or *R-3. If any of these symbols appear on the label addressed to you, it means that your membership is due to be renewed. Specifically, *R-1 is the first indication that renewal time is coming. There should be a card inside the magazine bearing a message to the effect that your membership will expire with the next issue. If *R-2 is encoded on the label, it means that our records show your membership expires with that issue. Again, a renewal card should be enclosed to reinforce the message. *R-3 encoding indicates that is the last magazine you will receive without renewing. Once more, there should be a card to that effect inside the envelope. After this three-level notification process, we make one more attempt to reach you by mail. This is done via First Class Mail in the event you have moved and we did not receive your new address. In some instances, we may call to see if your lapse in membership was intentional, or merely an oversight. After all, we believe this is a truly elite membership list and we know most of you are extremely busy—sometimes with incredibly complex and demanding projects.

How are our new procedures working? Okay, we think. Although we have had a few notices go out to members who have already renewed, most of these were "crossing-in-the-mail" occurrences. In a handful of other instances, the notices have elicited responses which helped us correct our records. We thank you for responding.

And, in the event you do not wish to renew at this time, please let us know why—whatever the reason.

One last thing, **please** use your **Membership Number.** Especially if you are using a company or institution purchase order, and double-especially if you have an international membership. Typically, funds are transferred and a bank in the U.S. issues a check in U.S. funds **without including a reference number.** Your Membership Number should be used as a reference number for such transactions. Thank you.

output...

Modem in Operation

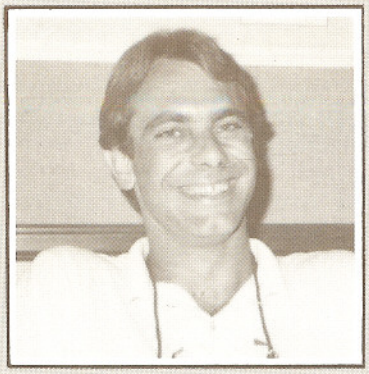
We finally have a modem in operation at our publishing offices. This is, for now, limited in use for the transmission of editorial material and classified ads. We hope to continue to expand our telecommunications activities. The modem is a Hayes Smartmodem 1200 which we purchased from MCM Enterprises in Palo Alto, California. It is connected to our C-10 and uses ProCALL software which was donated to The IACU by MCM. Several articles in this issue were received over the modem. If you wish to transmit something, call our regular business phone number, (714) 955-0432, and we will make arrangements for your transmission. For the time being, it is better to call in the afternoons, Pacific Time.

CROMIX—A User's Guide

We have received several inquiries as to how to obtain a copy of Leigh Thomas' excellent tutorial on CROMIX since we reviewed his book (Vol. III, No. 5). We have been in contact with Thomas and agreement to agree has been reached for The IACU to reprint his book and distribute it. We are finalizing the details of this agreement and will be publicizing them in future issues. Meanwhile, if you would like to reserve a copy, merely send us a note and we will put you on the back-order list. We hope to have all the details ironed out before next issue.

Seminars & CRAMPS

There has been quite a bit of interest in two items mentioned in recent issues. It seems that in addition to Bill Jaenicke's CROMIX Seminars, and Norman Vadnais' seminars on dBASE II and Operating Systems, several others are conducting seminars. If you have any such seminars or workshops scheduled, let us know subject matter, when, where, and all other pertinent details. We will be pleased to make readers aware of these offerings. If there are enough to warrant it, we would create a separate column to list them. Write us with full details.

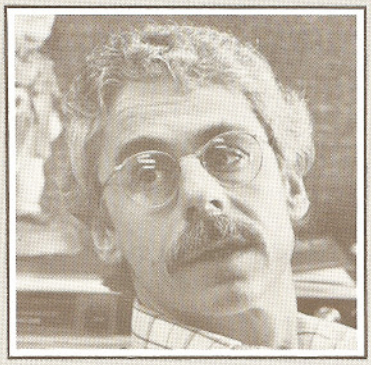


Bill Jaenicke

The other item is the Cromemco Camp (CRAMP) mentioned in Vol. III, No. 5. It seems there is a good deal of interest in a workshop of this sort, and plans are taking shape. See "bits and bytes..." for details.

Insurance

Some two + years ago we negotiated with an insurance broker for a low cost, group insurance policy to protect U.S. Members' computers and software. The policy was underwritten by Fireman's Fund Insurance Companies and was modified to provide higher limits than normal, as well as broader coverage. It is vitally important for anyone with a business system at home to have either a rider on the homeowner's policy, or a separate EDP policy. **The IACU EDP Policy** provides comprehensive coverage at a rate of 75 cents per $100 valuation. That translates into $75 per year for insuring a $10,000 system against a broad range of perils. Take a close look at the value of your system—both its dollar value and its value to you—and determine if it is properly covered. If you do not have adequate coverage now, call William L. Pope, Vice President, John Burnham & Co., (714) 833-2462, and get your system protected.



Richard Kaye
Editor

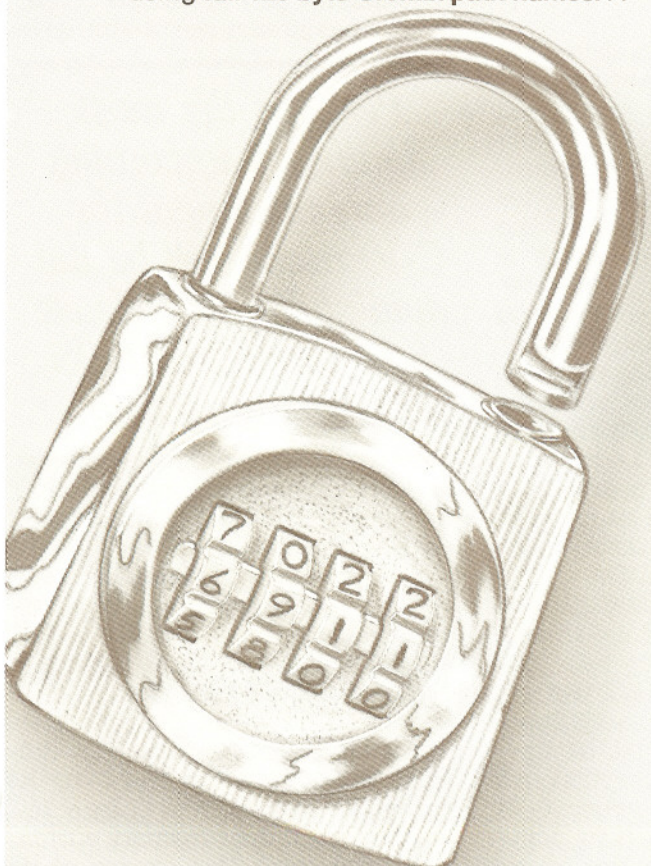
The SIMULATOR with the right combination unlocks the power of Cromix for your CDOS and CP/M programs

Our CDOS-CP/M Simulator is designed to replace Cromemco's simulator in all Z-80 and 68000 Cromix configurations and incorporates powerful features that make your system work more efficiently and effectively.

All CP/M 2.2 Systems Calls are processed and all MP/M system calls are ignored without creating fatal errors.

Dynamic Printer Control — Allows up to 4 printers to operate under program control of the CP/M I/O byte. Printer output can be directed to any device or file you choose. If the selected printer is busy, output will automatically be made to a file that can be printed later. The ^P function of CP/M and ^W/^T functions of CDOS are also supported.

Location of Directories (B:-Z:) — can be specified in another environment file (.profile) using **full 128 byte Cromix path names**. A default directory (/lib/ovr) is always searched after the specified directory if a file is not found.



Environment Files — can be created that specify the running environment for specific programs. These files include up to 34 128 byte function keys, printer spooling On/Off, printer selection, upper case lock, circular buffer line count, and CP/M or CDOS emulation flag.

Programmable Function Keys for All Common Terminals — including those without function keys. Once function keys have been programmed, they can be saved to an environment file that is automatically loaded the next time the program is executed.

Printer Spooling — Spooling to the printer device can be enabled with the keyboard or an environment file.

EOF Characters (^Z) — are eliminated from the end of user disk files.

Input Line Editing — As you enter a line of data, the simulator allows interactive editing (exchange, deletion, or insertion) and/or recall of up to 255 lines from the circular line buffer.

Command Function Menu — allows the user to branch to our command menu and selectively change the environment features. In addition the **Fork to a Shell** makes it convenient to leave a program, work on other files and reenter the program where you left it.

Used properly these enhancements will give you greater control and flexibility with your system.

Call for more information — Dealer Inquiries Invited.

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Palo Alto, CA 94301
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NEW SOFTWARE FOR THE C-10

Continued from front cover

(see I/O News Vol. 3. No. 4) and are supplied with the C-10MP.

Cromemco has also announced the availability of CP/M for the C-10. This package (Cromemco model number C-10CPM-S) provides users with an alternative to the CDOS operating system which is supplied with the C-10. CP/M for the C-10 has a **Transient Program Area** (TPA) of approximately 52K.

In addition to increasing the number of industry-standard offerings for the C-10, Cromemco is continuing the development of a number of significant proprietary packages as well. DiskMaster is the latest addition to the Cromemco Master-series of user-friendly software.

DiskMaster offers the capability of copying files to and from several types of non-Cromemco 5¼" diskettes. DiskMaster's major use will be to copy standard CP/M-80 application programs available on Kaypro 5¼" formatted diskettes onto C-10 format for use under C-10 CP/M. Its alternate use is for copying character files created on an IBM PC or Tandy Model I. For example, a WordStar, SuperCalc 2 or dBASE file created on IBM PC can be reformatted for the C-10 and then be used by the C-10 version of WordStar, SuperCalc or dBASE. Diskettes currently supported by DiskMaster are IBM PC-DOS 1.00 single-sided, double-density; IBM PC-DOS 1.10 double-sided, double-density; Tandy Model I single-density; and Kaypro System 2 single-sided, double-density diskettes. Additional file management functions provided by DiskMaster include displaying the names of files on non-Cromemco diskettes and erasing files from non-Cromemco diskettes. DiskMaster features an easy-to-use menu from which these functions are selected.

Other Master-series software available for the C-10 include StatMaster, a statistical analysis program (see I/O News Vol. 3. No. 3), TeleMaster, a communications package, and SpellMaster, a 100,000 word spelling checker. These are in addition to WriteMaster, PlanMaster, and MoneyMaster which come standard with the C-10SP. Several major enhancements were also recently made in WriteMaster and PlanMaster. Cromemco has already distributed new versions of these programs to subscribers of the C-10 Software Update Service (SUDS).

Perhaps the most significant upcoming announcement for C-10 users will be the availability of Release 5 of the C-10 CDOS operating system.

Perhaps the most significant upcoming announcement for C-10 users will be the availability of Release 5 of the C-10 CDOS operating system. Unlike the current Release 4 of CDOS, in which the operating system is loaded from the disk into RAM memory when the C-10 is turned on, Release 5 of CDOS actually resides in ROM memory within the computer. This means that much more RAM memory will be

available for programs. With a single disk drive the TPA is now 56K and is reduced by only 1K for each additional drive. More space will also be available on the C-10 diskette (since the file CDOS.COM will be eliminated) and the system will boot up essentially instantaneously.

The SUDS update for Release 5 will include not only a new diskette, but also a new system ROM so that existing C-10 users will be able to upgrade their computer to this newest release.

Other improvements in Release 5 include elimination of the bright utility and making this feature intrinsic to the system. Screen brightness, then, can be changed at any time by depressing control-shift up-arrow or control-shift down-arrow. This new software release will also automatically power-down the C-10 display (while maintaining memory integrity) when the C-10 is idle (timing out 15 minutes after the last activity). The display then turns on instantly when any keyboard key is depressed. With this feature most users will find that there is never any need to turn off the power switch (powered-down the C-10 only consumes about 15-watts of power).

With release 5 the screen can also be turned off from the keyboard (by depressing control-shift X). This results in approximately a 25% increase in processor throughput which can be useful when the machine is performing lengthy numerical calculations (or a high-level game of chess!). Release 5 also supports a full 9600 baud transmission rate when the C-10 is used in terminal mode (earlier versions were limited to 4800 baud).

We also have been told that Cromemco will be releasing an 8-inch floppy disk drive for the C-10 within the next few months, and the software drivers to support this disk drive have been included in Release 5.

All-in-all the new wave of software support from Cromemco for the C-10 is extremely impressive and is designed to meet the needs of both users who have stand-alone C-10's and those who use the C-10 as a workstation on a larger Cromemco system.

WHAT IS SUDS AND WHO NEEDS IT?

Continued from front cover

The method of subscribing is quite straightforward. A user fills out the SUDS form (part of the License Agreement) that comes with the software and sends that, along with a copy of the license agreement or other proof of purchase and the $95.00 payment to Cromemco. Two-year SUDS subscriptions are also available.

Back to the original question, who needs it? In our experience, it

It is an absolute must for any user's operating system.

is an **absolute must** for any user's **operating system.** This is true whether the user is under CDOS, CROMIX, or C-10 CDOS. This will presumably remain consistent as other operating systems are introduced.

Another **must** category is any 68000 software. The 68000 CPU has been in mass distribution for less than two years. One can reasonably anticipate that all 68000 software, no matter what the source, will need debugging, improving or enhancing for the next several years.

A third category of software to be considered for SUDS subscription is the group that contains the established Z-80 languages that have been in use for years. This category is a pure judgement call—your judgement. For example, if you use such well-tweaked languages as 32K Structured BASIC, or Macro Assembler, you may be totally satisfied with their current performance—even if you use your system for software development. On the other hand, if you use COBOL, or 'C' you may want to subscribe.

A perfect example of the wisdom of subscribing to SUDS is in process now. Cromemco is on the verge of releasing Version 5 of C-10SP. The SUDS Note cautions that the new software is "...for use only with C-10's [sic] having a 32K ROM-based operating system." Interesting comment, what? Well, it's a comment that bears inspection.

Version 5, when sent to SUDS subscribers, includes a replacement ROM that contains almost all of CDOS. The program file, **cdos.com** has been eliminated from the C-10 system disks. The result is that a C-10 user will now have about 56K of RAM available. This additional memory allows a whole raft of CP/M programs, too memory-consuming for earlier versions, to run on the C-10.

In addition to the ROM included with Version 5, there are several significant updates and new features incorporated in the new release. (See: "New Software for The C-10," this issue.)

That's the good news for C-10 users who subscribe to SUDS. The bad news is that if one does not subscribe to SUDS, there are no current provisions for obtaining the new ROM. Unless, of course, one wants to buy another C-10SP. So, it seems that a SUDS subscription for C-10 owners becomes a very worthwhile, and extremely wise—considering the benefits—investment.

To sum up, our advice—our strongest advice—is to keep your operating system (or systems) subscribed to SUDS at all times.

Second, all 68000 software should be under SUDS for the next few years, at least.

And last, use your judgement as to established Z-80 software. Only you can know how well it works for you in your present uses, and how much an enhancement to it could improve your performance. One thing that should be considered with this category of software is an annual "checkup" with your dealer to determine if any significant changes have occurred. If this approach does not suit you, take two aspirins and call I/O News in the morning.

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A Formatted Input Routine For 32K Structured BASIC

by Leigh R. Thomas

Summary

The INPUT statement which is commonly used in BASIC programs to obtain keyboard-entry data does not contain either error checking or input formatting. A subroutine to replace INPUT which provides for these things and which may be expanded to include case conversion and numeric-only input is described.

All writers of BASIC programs will be familiar with the INPUT statement, which finds use in obtaining keyboard input from the user and passing it to a variable. Most BASIC programs will use many such statements.

Commonly there are several similar program steps each time INPUT is used. The cursor is typically moved to the appropriate part of the screen, a prompt is printed (which may be part of the INPUT statement itself) and the INPUT function is invoked. The system then waits for user input, terminated by a carriage return. Upon termination of input, the program typically performs various error checks on the input data, most commonly for correct length, and finally the variable is made available to the rest of the program for processing, use in a calculation, storage on disk, or whatever.

The INPUT statement has some major limitations which must typically be overcome by additional program lines. In particular, no indication is available on the screen of the allowable length of user input. Should a user, say in response to the statement INPUT Z$, enter more characters than may be accommodated in the nominated variable Z$, no error is automatically generated. Rather, just those characters which will fit are passed and the rest are lost. It is the responsibility of the programmer to include additional error checking lines following the INPUT statement to cope with this and other contingencies.

In any typical program there will be a mix of INPUT statements, where for some of these it is satisfactory just to hit return (not enter any data) and others where some data is definitely required. In yet other cases, it may be desirable to have some default "data" which, should the user simply hit return, the default data is loaded into the variable.

The INPUT statement alone does not offer the programmer capability to automatically handle these possible scenarios. The formatted-input subroutine shown is specifically designed to offer all these features automatically to the programmer.

Using the Routine

EXAMPLE 1.

Suppose you want the system to prompt the user at line 10, column 15 for "NAME." You set the allowable size of name (S) and set the prompt (Pr$). If there is no default "NAME" then M$ is set to "!". Assuming the user is not permitted to just hit return, the zero-length flag F(0) is set to "false", 0. Then you simply call the routine. Thus, a typical program line to achieve this would be:

```
100 Pr$ = "NAME" : S = 20 : L = 10 : C = 15 : M$ = "!" : F(0) = 0 : Gosub 6000
```

The subroutine will place the prompt at the nominated position (another subroutine 6500 actually places the cursor) and then draws a set of dots, equal in number to the size nominated. The cursor is then positioned over the first dot. The user types input data which overwrites successive dots. Should they attempt to overrun the dots (enter too long a data string), the bell sounds and the cursor does not move. Upon striking return, the entered data is available in Z$, the subroutine terminates and returns.

EXAMPLE 2.

Suppose you want, at line 5, column 7 a prompt "Number of days" and that the answer will usually but not always be, say, 3 with a maximum of two digits. In this case the routine may be used to place this default answer over the dots. Should the user wish to accept this default, just striking return is sufficient. If they require an alternative input they type data as usual, which overwrites the default data and other dots. Thus,

```
130 L = 5 : C = 7 : Pr$ = "Number of days" : M$ = "3" : S = 2 : F(0) = 1 : Gosub 6000
```

Now the prompt, followed by two dots, appears at the nominated screen position, but the first dot becomes overwritten by the default data "3". The user may, in this case (because F(0) = 1) just hit return, and "3" is returned in Z$.

Should the user make a typographical error during input, the DELete key may be struck, which backs up the cursor one position deleting the last key struck and replacing it with a dot. A user cannot backspace beyond the start of the dot field.

EXPLANATION OF THE SUBROUTINE

Variables used

All program line numbering is quite arbitrary and may be altered to any convenient program space at the discretion of the user. The main subroutine uses several variables which would normally be explicitly dimensioned near the beginning of the program. The major variable is Z$, which is where user input is ultimately returned. In the example this is dimensioned to 60 (i.e. 61 characters, since numbering begins at zero) but this is quite arbitrary. Since M$ is intended to contain default data for Z$, this variable is given the same length. The prompt which is printed to the left of the dots can be any convenient dimension; in the example Pr$ is up to 26 characters long. B$ is the bell char-

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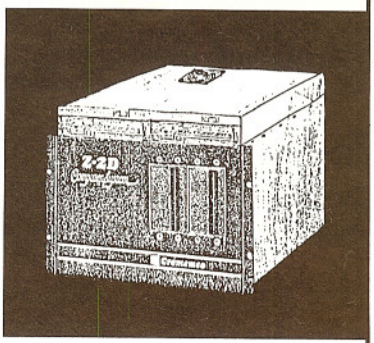

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acter, causing the bell to sound when it is "printed." The array F(x) can be any necessary size. The example given uses one location only, F(0), as the zero-length-allowed flag, which is set to true(1) or false (0) before calling the routine. Additional flag locations, F(1), F(2), etc. could be utilized as necessary to expand the functions of the routine (see description later in this text). Finally, A$ must be dimensioned to be just one byte long (Dim A$(0)). A$ is used to GET one character at a time from the keyboard, via channel zero.

Cursor Placement Subroutine

Cursor placement is achieved by another, simple, one-line subroutine which, in the example, is numbered 6500. It simply takes the nominated line (l) and column (c) variables, adds the necessary offset to them and prints (without a trailing carriage return) the necessary string to place the cursor on a Cromemco-like terminal.

Formatted-input Subroutine

At line 6015 the cursor placement subroutine is called, immediately followed by a print statement to display the prompt, Pr$, followed by three spaces. A For/Next loop then draws a set of dots on the screen following the prompt where the number of dots is equal to the required maximum input length, set by S. The column counter, C, is incremented by the length of the prompt and its trailing spaces and the cursor placement subroutine is invoked again, this time to position the cursor over the first dot.

Line 6045 checks the variable M$ which will contain the default data if it exists. If no default data is specified the first character of M$ will be the symbol "!", in which case control branches to the section of the routine which accepts user keystrokes. Should a default data item be specified the first character of M$ will not be "!", in which case M$ is printed at the current cursor position, overwriting as many dots as necessary. Should this occur, the cursor must be repositioned over the first character field, achieved by line 6060 which simply calls the cursor placement routine again.

Actual data input from the keyboard begins at line 6062 and continues to line 6110. This set of lines is effectively equivalent to an expanded-function INPUT Z$ command though, as you can see from the listing, the "INPUT" function is not used at all. Instead, data is obtained direct from the keyboard channel, numbered zero, which is always open in BASIC or SBASIC.

Line 6065 does two important things to initialize the routine. Firstly it fills the variable Z$ with nulls (since the " – 1" string reference implies all character locations). Secondly, it sets a new pointer, S1, to zero. S1 points to the location within Z$ where the next character will be loaded as it is gathered from the keyboard. Since character positions begin at zero, S1 is set to zero upon startup of the routine.

At line 6070 a keystroke is collected from the keyboard via a GET\0\A$ (get from channel zero enough characters to fill A$). This causes the system to wait for a key entry. Since A$ is only one byte long, only one keystroke is needed to fill A$ and control proceeds to the next part of the line. Note that no carriage return is needed; the keystroke is automatically loaded onto A$. The final part of line 6070 tests A$ to determine if it was the carriage return key (ASCII 13) which was struck. If so, then user input is terminated and control passes to line 6200.

Assuming the key struck was not carriage return, control passes to the next line where an IF statement tests that the key was NOT the delete key. Thus, for characters which are not carriage return or delete, control passes to line 6100. Here a test is made to determine whether the pointer into Z$ (S1) is equal to the allowable size of the entry (S). Should the user have typed sufficient keys to fill the allowable size the bell sounds (B$) and control reverts to line 6070. This loop prevents the user from overrunning the allowable data field size.

Should the size not overrun (the usual case) control passes to line 6110 which prints on the screen the character just obtained from the keystroke and loads Z$ with the character at the position pointed to by S1. S1 is then incremented and control loops to await another keystroke.

Thus, as keys are hit, the character is echoed on the screen, the cursor moving one space to the right on each occasion, overwriting the dots. At the same time, the gathered characters are loaded onto the return variable Z$ at successive locations.

The only exit point from the loop is a carriage return character, tested for in line 6070. Upon exit, Z$ contains the entered characters.

Lines 6080 and 6085 accommodate the delete key, used by the user to back-up and correct an entry error. If a delete code is entered (ASCII 127) and characters have previously been typed (S1 is not zero) then the required sequence of events is to move the cursor back one space, print a dot to obliterate the incorrect character, then backspace once more. The Z$ pointer S1 must be decremented and a null loaded into Z$ at the location of the old, incorrect data. Line 6085 attends to these functions before looping to await new input. The only exception to these events is the special case where a delete key is struck at the first character position of the field, effectively meaning the user is trying to backspace beyond the start of the field. This possibility is trapped at line 6080, the bell sounds and control loops once more to the get-data line.

The ancillary functions of the routine are attended to by lines 6200 to 6225. Line 6200 checks the zero-length flag to determine if a zero-length input was allowed. If not, then F(0) will be zero. Should the user have simply struck return without entering any data, Z$ will have a zero length. If this is not allowed, the bell sounds and control reverts to line 6060, placing the cursor once more at the beginning of the dots before awaiting new input.

Line 6205 checks default data and the zero-length flag. If a zero length was allowed and default data did exist (was NOT "!") and the entered length was indeed zero, then Z$ is loaded with M$, the default data. Should a zero-length be allowed but there was no default data (M$ = "!") then Z$ is left untouched, full of nulls and thus, effectively a zero length.

Finally, lines 6220 and 6225 place the cursor at the end of the screen data field and print spaces to clean

up any remaining dots which were unused.

A Note on Speed

It may seem that the program is called upon to perform an uncommonly large amount of processing between successive keystrokes. Remember though, with a 4MHz. processor, BASIC can do an amazing number of instructions in the time it takes you to type two successive keystrokes! The routine will not drop any characters at normal typing speeds.

Additional Functions

The routine as shown could be greatly expanded. In particular, two useful functions may be incorporated; the automatic trapping and converting of lower-case text to upper-case and the allowing of numeric-only input. Additional program lines between 6100 and 6110 could be included which, using additional flags F(1), F(2) etc., could test for a particular range of ASCII value either subtracting an offset as required to convert to upper-case or, for numeric-only input, sounding the bell and blocking any input which was not either a digit, a period or a plus or minus sign.

FORMATTED INPUT ROUTINE FOR SBASIC

```
Set up variables

  15  B$=Chr$(7)
  20  Dim A$(0), M$(60), Z$(60), Pr$(25), F(5)

Body of formatted-input routine - see text for explanation

6000  Rem GET SCREEN DATA
6015  Gosub 6500
6020  @ Pr$;"    ";
6025    For I=1 To S
6030    @ ".";
6035    Next I
6040  C=C+Len(Pr$)+3 : Gosub 6500
6045  If M$(0,0)="!" Then 6062
6050  Gosub 6500
6055  @ M$;
6060  Gosub 6500
6062  Rem effective input routine now
6065  Z$(-1)=Chr$(0)+Z$(-1) : S1=0
6070  Get\,0\,A$ : If A$=Chr$(13) Then 6200
6075  If A$#Chr$(127) Then 6100
6080  If A$=Chr$(127) And S1=0 Then @ B$; : Goto 6070
6085  S1=S1-1 : Z$(S1,-1)=Chr$(0) : @ Chr$(8);".";Chr$(8); : Goto 6070
6100  If S1=S then @ B$; : Goto 6070
6110  @ A$; : Z$(S1,-1)=A$ : S1=S1+1 : goto 6070
6115  Rem end of input routine
6200  If F(0) And Len(Z$)=0 then @ B$; : Goto 6060
6205  If F(0)=1 And M$(0,0)#"!" And Len(Z$)=0 then Z$=M$
6220  C=C+Len(Z$) : Gosub 6500
6225  @ Spc(S-Len(Z$))
6230  Return

Place Cursor subroutine

6500 L1=L+32:C1=C+32 : C$=Chr$(27)+"F"+Chr$(L1)+Chr$(C1) : @ C$; : Return
```


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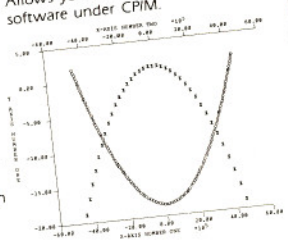

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Software Review:

proBOOKS: An Ideal Accounting System for the C-10

by Bill Jaenicke

Product : proBOOKS release 3.0
****Producer** : Fair Harbor Software
P.O. Box 295
Grapeview, WA 98546
(206) 275-5896
List Price : $695.00

**Originally submitted for review by Interdiscipline, Inc. Rob Spooner, the author of proBOOKS, has since left and founded Fair Harbor Software. Interdiscipline and Fair Harbor Software still maintain a close working relationship. Interdiscipline, Inc. is located at 403 S. Brandon, Seattle, WA 98108, (206) 763-2099.

Introductrion

In programming circles there is an anecdote about the "third best solution." It goes as follows: "An experienced programmer always seeks the third best solution. The best solution can be thought about, designed, but will never be implemented. The second best solution can be done, but will require more time and resources than are available. The third best solution is the one that can be implemented with available resources, and will work." It was with this design philosophy that proBOOKS was born.

Overview

proBOOKS is a professional bookkeeping system written in 32K Structured BASIC. The target machine is Cromemco's C-10 personal computer, although there are now versions for S-100 based CDOS and CROMIX systems.

It is a double-entry bookkeeping system fashioned after the manual or "posting machine" method of recording accounting transactions on "ledger cards." Transactions are posted directly to ledger cards, which can be displayed or printed at any time.

Time and costs for jobs can be recorded and analyzed. "Jobs" refer loosely to any situation where time and/or expenses are to be accumulated and analyzed under groupings.

The user is expected to be an individual or small firm with no need for fancy financial statements: there are no "levels" or "departments." Nor are there budgets at the GL level, although budgets can be kept for jobs. There is little "hand holding" which, at the price is to be expected, and the user should be prepared to make an effort to learn the programs. The system will not replace an accountant but will make the user less dependent on him/her for routine reports. The audit trail provided by proBOOKS is sufficient for review by a CPA, and will provide the information needed for proper review and testing of accounting procedures.

The Package

The proBOOKS package comes housed in an easel-type binder, which allows it to be conveniently propped up when learning to use proBOOKS. The documentation consists of a complete manual, a tutorial, and sample report printouts. Also included are the Software License Agreement, Software Registration Form, and an application for the proBOOKS Update Program (PUP). PUP costs $95 a year and entitles registered proBOOKS users to software and documentation updates and enhancements, as well as Accumulated Tips from other proBOOKS users. The system is supplied on a 5 inch diskette (8 inch also available) which contains the proBOOKS programs and tutorial data files.

Product Description

proBOOKS allows for the following: a General Ledger consisting of "ledger cards" which are derived from the Chart of Accounts. The Chart of Accounts is rigid in design: there can be up to ninety-nine accounts (numbered 1 through 99). Five predefined ranges exist that separate Assets, Liabilities, Equity, Revenue, and Expenses. Within the predefined ranges there are a number of preset accounts, such as 2 for Cash in Bank, 5 for Accounts Receivable, and 41 for Sales. Although the account numbers are preset, the descriptions can be changed.

General Ledger accounts are either "real" or "control." Real accounts have a ledger card to which transactions are posted. For example, Cash in Bank would be a real account. Control accounts indicate that a "subledger" exists. Subledgers can be set up for Receivables (Customers), Payables (Suppliers), Employees, Jobs, or General Purpose. For example, the Accounts Receivable account would be a control account. The total amount for Accounts Receivable is the total of all customers' cards.

The following types of journal registers are provided: Journal Entry (JE) (e.g. recording bank charges), Cash Receipts (CR), Cash Disbursements (CD), Sales Journal (SJ), Purchases Journal (PJ), Progress Billings (PB), Closing Billings (CB), Employee Expenses (EE), Year End Closing Transactions (YE), and Write-off Balance of a Job (WO).

A Source Journal listing can be generated which mirrors all posted transactions. The listing can be for all, or specific, source types. The listing can be produced on the screen or on the printer.

An Account Review and Print program enables the information on cards to be displayed or printed. There are various options available

to control the range of transactions presented from a given card.

The Trial Balance and Cutoff routines allow for the printing of interim trial balance reports and for the month-end cutoff (closing) of the General Ledger. Options are available for controlling the formats and details of these reports. The Final Cutoff must be run at month-end, before transactions for the next month are entered. The financial statements can be run only after the Final Cutoff has been performed. It is during the Final Cutoff that the adjusting Work In Progress entry is made to the two relevant accounts: 11 Work in Progress and 43 Increase (Decrease) in WIP.

Two types of financial statements are provided: the Statement of Operations (Profit/Loss) and the Balance Sheet. The Statement of Operations can be in a two or three column format: the two column format displays the current month and year-to-date figures; the three column format presents the current month, last month, and month before that. There is no provision for interim financial statements (before Final Cutoff).

An Aged Listing of Accounts is provided, which would normally be used for Accounts Receivable (G/L account 5), but which can be run for any card. The report can be for the month up to the last cutoff, or as an interim report showing transactions since the last cutoff. The balance is aged into current, 30 days, 60 days and 90+ days, which are determined from the number of cutoffs since the transactions were entered (not the transaction dates).

A flexible Accounts Receivables Statements program is provided for generating Customer Statements. Among the options are All or Selected Customers; printing to be done on Letterhead or Preprinted forms, which can be continuous or single sheet. There are also choices as to the detail which is to appear on the statements.

The ability to do Open Item Processing is also provided. This is useful in "explaining" the balance of a ledger card containing many transactions.

Time sheets can be entered for employees for recording time and expenses spent on particular jobs. An "operation codes" file is pro-

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vided which can contain up to 99 distinct operations. As with the Chart of Accounts, there are predefined ranges: for overhead functions (sick pay, vacations, etc.) which are not applied to jobs, and all others which require a job. The hours an employee works are recorded by day. Budgets can be set up for jobs.

An extremely flexible Job Cost Analysis program is provided. Options exist for selecting all jobs, a specific job, or jobs done by a specific partner. The analysis can show the details of job costs, or can be compared with budget figures set up for that job. Figures can represent either unbilled amounts or all amounts from the beginning of the job.

The Employee Productivity program analyzes the categories of time present on the employee time sheets. Various options exist for specifying the periods to be analyzed. This report can only be run for all employees, i.e., a single employee cannot be specified.

In addition, there are a number of Miscellaneous Reports available. These include Form Letters, Envelopes & Labels, Selective Master File Reports, Pro Forma Financial Statements, and a Transaction Trace.

Finally, there are a number of "housekeeping" functions to take care of updating the firm name, updating the operation codes, updating the financial dates, changing GL accounts, and choosing drives for Master Files & Cards Files, to name a few.

All in all, proBOOKS provides a very complete and diverse set of accounting functions. It is even more impressive when you consider that all of this is available for a C-10 with a single drive!

Documentation

I was impressed by the quality of the documentation provided. For one, there is a tutorial which guides the new user through a whole series of functions to be performed by proBOOKS. The tutorial does not cover all aspects of proBOOKS operations, but it does provide enough examples to get a good feel for the system. The tutorial can be completed at the user's leisure. In total, going through all of the examples and printing the reports takes several hours.

Not all answers to questions that arise during the course of the tutorial are answered: this requires studying the manual. I found the manual to be complete and readable. It is designed for folks without any prior computer background, but familiarity with general accounting techniques is expected. All of the various proBOOKS menu items are discussed at the beginning of the manual. This is followed by Data Entry conventions, Month-End procedures, Year-End procedures, and use of subledgers. The last section is devoted to getting started: making a working disk, configuring the system (one or more disks), setting up the Chart of Accounts and Master Files, and making the opening journal entries.

The fact the setup procedures are given last is in line with proBOOKS' view that the user must be familiar with the workings of the system before attempting to use it. The tutorial and manual are the only sources of information, for no online help facilities are provided (one of many necessary tradeoffs that make it possible to run such a complete system on the C-10).

A nice feature of the documentation is that the tutorial section, manual, and sample printout sections are on different colored paper. This makes it easy to locate a given section without the need for dividers.

This is not a program that one learns by jumping in and "playing." It is expected that the end users will utilize the tutorial material and the manual before attempting to set up their own set of books. I found it necessary to go through the tutorial exactly as presented, then read the manual, then go back to the tutorial and experiment on my own.

Throughout the documentation, the importance of maintaining up-to-date backups of data files is emphasized. The especially critical times for backing up (such as before a Final Cutoff) are indicated. This advice is meant to be followed, for there are times when a power outage or disk error could result in corrupted data. In this instance, a backup is the only way to restore the file system integrity.

Installation

The installation procedure for proBOOKS is straightforward, but can vary according to the configuration (number of disk drives) of the C-10 system. COPYFILE and COPYDISK are used to make a backup of the proBOOKS system disk. CDOS.COM and SBASIC.COM (optionally MENU.COM) can then be copied from the C-10 System Disk. The program is called from the CDOS prompt with the command line "sbasic menu.rsb," and results in the display of the proBOOKS Main Menu. Although designed to run on a C-10 system with a single disk drive, it is possible to configure proBOOKS for operation with two drives. This is accomplished by way of the "housekeeping" menu selection. The greater storage afforded by two disk drives would enable a larger volume of transactions to be kept "online."

Operation

proBOOKS is a menu-driven system. The primary set of functions appears on the Main Menu. Selections from the Main Menu generally result in a series of specific questions or set of options pertaining to the selected function. There is a good degree of input standardization. For example, the file maintenance routines (add, change, delete, etc.) for the Master Records (Receivables, Payables, Employees, Jobs, or General) all work the same.

A number of preliminary tasks need to be carried out by way of the Housekeeping menu option. These include starting the new company files (which erases the supplied tutorial files), starting a new source journal (which erases the tutorial source transactions), updating the firm name, updating the operation codes (timekeeping), and updating the financial dates. If the system has more than one drive, you can choose drives for Master files and Cards files.

The Chart of Accounts is then set up, followed by all of the Master Files for customers, suppliers, employees, jobs, and general purposes. The opening journal entries can then be posted.

Transactions are entered in a double-entry format where the Debit and Credit accounts are specified along with an amount. The

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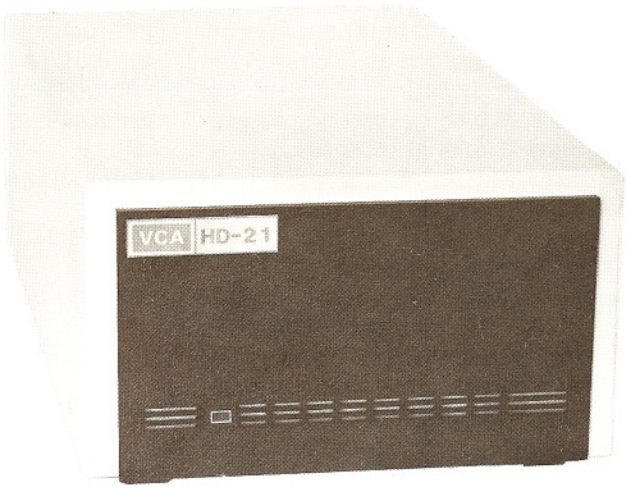

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amount is debited to the Debit account and credited to the Credit account. The debits and credits will therefore always be in balance. There is no batch entry of transactions, they are posted as they are entered. Erroneous transactions cannot be removed, but can be reversed by way of a reversing journal entry. This, of course, leaves an audit trail.

Transactions that apply to control accounts, such as Accounts Receivable or Accounts Payable, are posted to the corresponding Master File card. The customer or supplier (or employee) number is required as part of the account number. The format is the General Ledger account number (e.g. 5 for Accounts Receivable) followed by a decimal point and the corresponding Master File number.

Financial Statements can be run only after the Final Cutoff has been performed. Before this, interim Trial Balance reports can be generated. Transactions for a new month should be entered only after the Final Cutoff has been run for the old month. It is not possible to post transactions to a prior (closed out) month.

Periodically it is necessary to clear the Source Journal file. The frequency with which this is done is determined largely by the volume of transactions entered per period and the amount of available disk space. At minimum, this should be carried out on a monthly basis. Before clearing, a complete hardcopy listing of the Source Journal can (and should) be produced.

There is no Year-End Cutoff per se, although there is a journal source type (YE) for Year End Transactions. The year-end transactions close the operating statement accounts (40 and up) to retained earnings (account 38). For each account with a debit at the end of the year, you post a credit to the account and debit account 38. This is reversed for credits (normally the revenue accounts).

Adjusting transactions made by the accountant which affect operating accounts are posted through retained earnings. These may occur months after the year-end closing, and serve only to adjust the balance sheet. They will not cause proBOOKS to print a corrected operating statement.

Operating Features

After having used proBOOKS for a brief time, it was readily apparent that you had to be familiar with account numbers: be they General Ledger, Employees, Customers, Suppliers, or Jobs. Other than the Chart of Accounts, users can decide upon the numbering schemes most appropriate to their own situations. Various schemes are suggested in the documentation. To this end, it is necessary to keep current listings of the Master Files on hand when coding transactions or requesting reports.

Consideration was given to making the data entry process as quick as possible. New Master records and transactions can be entered quickly. All of the required sorting and indexing takes place after the data entry session has been terminated. The sorting and indexing techniques used in proBOOKS appear to be quite good. Taking into consideration the inherent slowness of floppy disk drives, I never found myself inwardly complaining about the time required for indexing and sorting. Actually, I was rather impressed that it happened as quickly as it did.

Most of the reports generated by proBOOKS do not require additional sorting. The ones that do are those that are not run on a frequent basis. Whenever a report is to be printed, the user specifies whether single sheets or continuous paper will be used. In the former case, the printing is halted at the end of each page, allowing a new sheet to be entered. As the stock CLQ printer does not have tractor feed, this capability is required.

One thing that takes getting used to is the number of different commands used for exiting from a given routine. In some cases an "X" is used, at other times "XT," and at others "0." In most cases the appropriate response appears on the screen, but there are instances where no indication is given. One must consult the documentation to find the acceptable response (until you reach the peak of the learning curve).

Special Features

There are a number of niceties in proBOOKS that make using it easier and more enjoyable. For one, the ESCAPE key is enabled. This allows you to terminate the printing of a report before its natural completion, or to start over with the entry of a journal transaction. The action of the ESCAPE key is detailed for each proBOOKS function in the documentation.

There is the capability of having all printed output directed to a disk file rather than being printed directly on the printer. This makes it possible to edit reports with a word processor before printing them.

Whenever the user is requested to enter information, there is generally a "suggested" or "default" response that appears after the prompt. If the default response is desired, it can be supplied by pressing the RETURN key. Generally, it is not necessary to press RETURN to terminate a response. For example, if a single character ("Y" or "N") is requested, pressing the appropriate key is all that is necessary. proBOOKS "grabs" your answer without waiting for you to press RETURN. Although this may take some getting used to, it is greatly appreciated once you have become familiar with the system.

The heavy reliance on knowing account numbers is eased somewhat by the ability to "guess" or approximate a number. For example, if you are entering a new Customer, and are not sure what the next available number is, you can enter a part of the number followed by "?" marks for the remainder. The system displays all Customers that begin with the sequence of numbers entered. It is then a simple matter to determine the next number in the sequence.

Zip codes are handled well. The system recognizes three zip code formats: the five digit U.S., the nine digit U.S., or the 3-space-3 format of the Canadian and U.K. postal systems.

Finally, the Job Costing Analysis, Timekeeping, and Form Letter Writing can be considered as "special," since they are not usually found in a basic "bookkeeping" system. It amazes me that proBOOKS can do so much on a single floppy disk! This is possible only because of the constraints built into the

General Ledger.

Specifications and Limitations

Hardware requirements are simple: a C-10 with at minimum one, 390K drive system, and a printer with a minimum width of 80 columns (with or without tractor feed).

The most severe restriction is in the design of the Chart of Accounts, which is limited to 99 accounts. Many of these accounts are predefined. The simple Chart of Accounts makes for simple financial statements: no fancy subtotaling, supporting schedules, comparisons to budget, or comparisons to last year's figures. Accountants may find this an inadequacy, but proBOOKS is not a tool for accountants. By keeping the Chart of Accounts simple it was possible to add other more desirable features such as Job Costing and Timekeeping, while staying within the hardware constraints imposed by the C-10.

Employee numbers can range between 1 and 999. Customer, Supplier, Job and General Master records can have numbers between 0 and 999999. The numbering scheme employed is up to the user.

Limitations on the number of transactions that can be accommodated depend on the amount of disk storage available. With one 390K disk system, approximately 2,000 transactions can be kept online. With two disks, the limit is raised to approximately 8,000 transactions. For S-100 systems with a hard disk the number of transactions that can be handled is "very large."

Areas for Improvement

When I began this review, it was on Release 1.00 of proBOOKS. As with any software that has a release number of 1, I found a number of things that were not very appealing. There were also some programming bugs. However, with release 3.00, all of the bothersome items I had come across had been rectified. Other items that I did not catch were also fixed. Additional features that would have been nice, but certainly not necessary, had been added. Consequently, I have no suggestions for improvement, save one: that the Year End Closing procedure be detailed more thoroughly in the documentation.

The author of proBOOKS, is to be commended on his "third best solution." It more than does the job. If I were Fair Harbor Software, I would raise the price of proBOOKS to at least $995. It's worth far more. And if I were a potential purchaser, I would be happy to pay that price in hopes that the additional cost would be used to finance the development of more software of this caliber.

Summary Evaluation

Ease of installation	Very good
Ease of use	Very good
Documentation	Excellent
Speed	Very good
Reliability	Excellent
Effectiveness	Excellent

*Reliability = No bugs encountered
*Effectiveness = Does it provide the benefits it was designed to

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INPUT

Continued from page 5

current versions of Cromemco software. Thank you for the great continued efforts to help make Cromemco systems reach their potential.
Your's truly,
George Collier, Jr.
Southeastern Oklahoma State University
Durant, OH 74701

Watson's book was published by MacMillan and should be available at any computer bookstore or through the MacMillan catalog. See **output...,** this issue, regarding **CROMIX—A User's Guide.**

The listing of current versions of Cromemco software will, hopefully, become a standard report in each issue. This information comes to us in a 32-page handout listing each product by its catalog number, and includes all the files contained on the disk. Reading this handout and converting into the simplified form we have used almost requires a computer scientist. Fortunately, Bill Jaenicke has the qualifications. We'll try to do better.
Editor

Oops...from Leigh R. Thomas
Editor:

On the matter of my article you recently published (Vol. III, No. 5) on running multiple printers under CROMIX, I am chagrined to admit that my learned colleagues reliably inform me I was in error.

It seems that later versions of CROMIX's spooler will, in fact, run two printers simultaneously. This is curious, for despite having repeatedly tried to achieve this happy state myself, I have yet been unable to do so. In any case, when one is wrong, one must admit it; so admit it I do. In the light of this new information I shall try once again printing simultaneously via spool. Perhaps this time I'll be lucky.

Even given that spool will run two printers simultaneously, I remain unsure if it will run three or more. Perhaps. In any case, the command file given will certainly run as many printers as required, all at the same time.

Finally, despite the fact that the original premise of the article appears incorrect, I do hope that some of the command file programming techniques utilized therein prove of interest and use to other readers.
With kindest regards,
Leigh R. Thomas

And our kindest regards and respect to you, Mr. Thomas, for your gracious correction.
Editor

CHAOTIC EXCHANGE

Continued from front cover

the CME lies an equally busy, but much quieter, room. This room houses the racks of equipment—including 60 Cromemco System Two computers—that record all the activities taking place directly above. The Cromemco systems are linked to a mainframe database and serve a network of hundreds of data terminals scattered around the exchange floor overhead. Before, during and after the trading periods, these terminals flash information on the latest prices and transactions to the exchange members. This information is the lifeblood of the traders' decision-making.

Despite the apparent complexity of the CME, the recording process is deceptively simple. Each transaction is input to the mainframe database. Two, System Two computers form a front end unit that provides protocol conversion to ASCII, and distributes the data to other Cromemco systems that serve as cluster controllers.

Each of the controller computers includes eight TUART cards that further distribute the data to sixteen terminals on the trading floor. The controller system receives the updated information, updates the memory, and refreshes each of the terminals.

In operation, a trader on the floor simply chooses a menu of information items (e.g., gold futures) and the terminal immediately provides the latest data on transactions, prices and volumes.

The structure of the network is such that any failure in one of the boards or systems has no impact on the remaining terminals. In addition, the number of cluster controllers is essentially unlimited, so future expansion of the system is both easy and economical.

In this environment, no one is thinking of bits and bytes. They're concentrating on **information** and the impact of that information. Decisions are made quickly and the bottom line is that those decisions

One of several banks of Cromemco System Two computers in the basement of the Chicago Mercantile Exchange. The CME has 60 Cromemco systems following and recording each daily transaction.

can result in very large gains (or losses) to the players and those for whom they are making the decisions. Information is everything, and the dependable delivery of that information is essential.

The Chicago Mercantile Exchange was founded in 1919 to meet the needs of farmers and users of agricultural commodities. Today, it also provides hedging protection against price and yield fluctuations to a global range of money managers associated with financial institutions, domestic and multinational corporations, insurance specialists, importers and exporters, governments, and trusts. It deals in futures and currently lists cattle, hogs, and pork bellies.

In this environment, no one is thinking of bits and bytes.

A division of the CME, the International Monetary Market created in 1972, lists contracts for Treasury Bills, certificates of deposit, Eurodollar deposits, and foreign currencies.

Another division, established in 1982, is called the Index and Option Market, and lists Standard & Poor's 500 Stock Index, S&P's 100 Stock Index, S&P futures, and random-length lumber.

The Chicago Mercantile Exchange offers an example of how Cromemco systems can play a part in applications where reliability and expandability are imperative. The capabilities of the systems to make the links between a huge, mainframe database, and to distribute information to multiple terminals at a reasonable cost is an example of the strength of Cromemco computers.

Perhaps the traders on the floor take all that for granted, but the people at the CME who are responsible for transferring massive loads of data daily do not. They rely on the equipment and, by providing instant data to the traders, help turn the apparent chaos of the floor into a finely-tuned example of free enterprise at work. CD

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Inside CROMIX

William E. Jaenicke is an independent software consultant and president of SASi (Satellite Accounting Systems, inc.). In addition to the SASi General Ledger, his firm also developed QTS, a time-keeping and time management report package for professionals. He has been working with Cromemco systems for more than four years, including almost three years of experience with CROMIX. Jaenicke holds regular monthly seminars on CROMIX in his Newport Beach, California offices. He can be reached by phone at (714) 955-2220.

THE TESTINP FUNCTION—FACT AND FICTION

by Leigh Thomas

Editor's Note: Users are encouraged to submit their findings regarding the workings of CROMIX so that they may appear in INSIDE CROMIX for the benefit of all. This will ensure that there will always be fresh and informative material. In this spirit, we have received two worthy contributions.

Testinp is one of the most useful CROMIX functions which we all use in our command files. It ia also one of the functions which gives users the most trouble because it doesn't work in quite the way we might expect from a quick read of the manual.

Briefly, **testinp** has a syntax—

```
testinp –options filename
  string1 string2...string n
```

and it is used to determine if the nominated file contains any of the nominated strings. An example similar to the one in the manual serves to illustrate the concept.

```
echo –n "Do you want to shut down the system? "
input > temp
testinp temp Y yes oui si OK
if –err goto noshutdown
shutdown
%noshutdown;ex
```

The first line puts a question on the screen. The input function causes CROMIX to wait for typed input from the user, terminated by a carriage return. The output redirection used in conjunction with the input function sends this typed data into a temporary file, named temp (what else).

Now the **testinp** function does its work. It checks the contents of the named file (temp) for an exact match on any of the following strings, all of which indicate an affirmative answer which the user might have given in response to the question. Note that **testinp** is case-insensitive so it doesn't matter about capital or lower-case letters. If the user typed any of the nominated strings there is no error found and control continues to the next line which starts the shutdown process. On the other hand, should the user have typed anything which doesn't exactly match any of the nominated strings, **testinp** returns an error which is trapped in the following line, directing action to a labelled line which, in this case, does nothing but exit. The important point is, of course, that the shutdown line is skipped under these conditions.

The confusion over **testinp** resides in the assumption by many users (myself included until recently) that it will check through a multiword file for a match. Don't be fooled. Generally speaking, it won't because it seems unable to perform "substring" type searches.

To illustrate, had the user in the above example typed—

```
yes please
```

in response to the question, **testinp** would have returned an error and shutdown would not take place, despite the fact that the word "yes" formed part of the file contents tested.

The rule of thumb to be learned here is that **testinp** usually only functions as expected on ONE WORD files. An exception to this is noted below.

What brought this to light for me was an attempt to use testinp coupled with the **day** utility to determine whether it was approximately midnight.

If you type DAY at your terminal, you get a message on the screen like—

```
Today is Thursday
```

or similar. If you use a redirection you may send this output to a file. Thus—

```
day > temp
```

puts the above message string in a file named temp in the current directory where you might expect **testinp** could examine it. But beware, a line like—

```
testinp temp Thursday
```

will always fail to find the word "Thursday" despite the fact that we know it's there which illustrates the problem described. Similarly it will fail to find **any** of the words in the message, including "Today" and "is". What **testinp** is really doing is finding out whether the **total** file contains exactly a match on any string. Unfortunately, because of the way the **testinp** line is constructed with spaces between the nominated strings, you cannot even resort to something like—

```
testinp temp Today is Thursday.
```

for now it will return no error only if the file contains either the word (and **only** the word) "Today", "is" or "Thursday."

This can prove a nuisance to the enterprising command file writer but there are ways around it. The simplest way is to ensure that the file to be tested contains only one word. If you really must check for multiple-word matches, there is a way of doing it—undocumented as far as I can determine. In the above case, were we to type—

```
testinp temp "Today is Thursday."
```

thereby enclosing the whole, multiword string we want to test for in quotation marks, the **testinp** will work correctly and no error is generated.

Alternatively, the **–f** option may come to the rescue in certain circumstances.

This option looks at only the very first character of the file (not the

first characters of all the words in the file as we might naively expect).

To give a practical example, I was attempting to write a command file which waited until midnight (in background mode) to automatically do some backups. It occurred to me that the easiest way to find midnight was to find the time when the **day** utility returned a different answer from the one it gave a short time (say half an hour) before. Thus I invented a command file to keep two temporary files of the day output message generated some time apart and compare them periodically with the **cmpasc** utility.

The **cmpasc** utility will give one of two quite different output formats depending upon whether or not the two files match exactly. In the case that they do, you get a message like—

```
/cmd/templ matches /cmd/
temp2 exactly
```

or similar, depending upon the path names of the two files being compared. If the files do not match, you get a multi-line output message describing the differences like—

```
- - - - -> /cmd/templ
  Today is Wednesday
- - - - -> /cmd/temp2
  Today is Thursday
```

If the output of this **cmpasc** function is sent to a file rather than the screen it is available for examination by the command file underway. The **input** function may be used to lift off the first line of any file and direct it to yet another file. This seemed to be a convenient way of getting a single-line file from the **cmpasc** function which would reveal whether the days were the same or not.

I hoped to be able to invoke **testinp** on that file to find the word "matches" or "exactly", either of which would definitively tell the command file that the days were the same (it is not yet midnight). Of course, it didn't work, for the reasons given above and I suspect that a number of unwary CROMIX users will have fallen into similar traps in the past.

There are two solutions to the example. One is to use **testinp** with the **-f** option to match the "/" character. As you can see from the example outputs of **cmpasc** above, the first line begins with a "/" if the files do match, and doesn't if they don't.

The other option is to use the whole-string match of **testinp** as described above. For example—

```
testinp temp "/cmd/templ
matches /cmd/temp2 exactly"
```

which encloses in quotes the whole line which is returned from a successful compare where the file names are obviously example ones only. In this way, the **testinp** function will work correctly on the entire string if it is present in the nominated file.

Hopefully these ideas will clear up some of the mysterious failures of **testinp** you may have experienced.

Editor's Note: Next issue we'll present the command file to do the midnight backup.

MANAGEMENT OF CROMIX SYSTEMS USED FOR UNDERGRADUATE TEACHING

by Dr. Peter Norman

The Department of Chemical Engineering at the University of Newcastle upon Tyne uses three 5-user CROMIX systems for undergraduate teaching. One is allocated to the final year students who can use it 'on-demand'. The other two are used by the first year on two afternoons each week for instruction in programming in PASCAL. Otherwise the last two systems are available 'on-demand' for the second year students.

Student have neither the time or, in many cases the inclination, to learn about Operating Systems or software and how to string it together to get it to do what is required. Our attitude is that the computers are tools to be used for engineering teaching and practice rather than demonstrating virtuosity in software handling. I will describe in the next few paragraphs how our CROMIX systems are set up and managed in order to make the students' life as easy as possible from a user's point of view. This makes use of the extensive range of facilities offered by CROMIX.

INSTRUCTION IN PROGRAMMING

When students come to this Department, their main contact with computing has been on single user machines running BASIC. The concepts of editing, compiling and linking as well as hierarchical file handling and file protection, are quite foreign.

We use a Z-80 based PASCAL compiler for instruction. This was originally designed to run single user under CP/M. However, it runs quite happily in CROMIX but expects to find various files in particular locations. For the inexperienced user, getting hold of the files correctly is difficult. We have therefore made use of the command file facility in CROMIX. Figure 1. is a listing of a command file that will compile and run a PASCAL program.

```
%CHECK IF FULL COMPILE REQUIRED OR SYNTAX CHECK ONLY (CHK)
IF #1 = CHK MAKLIN -F /BIN/PASS1 PASS1
IF #1 = CHK PASCAL #2
IF #1 = CHK DEL PASS1
IF #1 = CHK GOTO FINISH
%THE FOLLOWING IS THE ASSEMBLE AND LINK
%FIRST SEARCH THE DIRECTORY TO SEE IF THE SOURCE HAS
%ALREADY BEEN COMPILED
LS -B #1.SRC > #1.TEM
TESTINP -D #1.TEM #1.SRC
%IF NOT, EXIT AND WARN THE USER THAT 'PCOM CHK'
%MUST BE USED FIRST
IF -ERR GOTO ERROR
%IF COMPILED CODE EXISTS, THEN ASSEMBLE AND LINK
DEL #1.LST
MAKLINK -F /BIN/LIBM.SRC LIBN.SRC
ASMBL LIBN,#1/REL
DEL LIBN.SRC
DEL #1.SRC
MAKLINK -F /LIB/PASSLIB.REL PASLIB.REL
ZLINK /N:#1 #1 PASLIB/S /E
DEL PASLIB.REL
DEL #1.REL
%EXIT WITH .COM FILE, AFTER DELETING LINKS
GOTO FINISH
%ERROR
ECHO
ECHO
ECHO You must do PCOM CHK before PCOM!
ECHO
%FINISH
```

Figure 1

The main features are:

a) A simple command, PCOM, followed by the PASCAL source file name is all that is required to compile and link the program.

b) The command file checks the user's directory to see if the source has already been successfully compiled. If not, the user is forced to specify the command PCOM CHK. In this case, the source is only compiled. The advantage is that time is not wasted in assembling and linking until the source has been debugged.

c) The command file removes all temporary links and files so that the user is not left with unnecessary garbage in the directory.

The command file makes use of the MAKLINK and TESTINP facilities of CROMIX.

ADVICE TO STUDENTS

When new facilities are added to

the systems, or when faults develop, it is useful to inform users with a newservice. This is simply accomplished by maintaining a file called NEWS.TXT which is displayed when the command file NEWS.CMD is invoked. We also make use of the inbuilt 'help' facility. New help files are added in the directory /USR/HELP on such topics as recommended reading lists, manual pages for computer aided designed software and answers to tutorial problems.

COMPUTER AIDED DESIGN

Our second and third year students make extensive use of computer aided design programs. These are often written within the Department using FORTRAN, PASCAL or, occasionally, BASIC. Since these programs usually require datafiles or operating system facilities, it is convenient to group them in a directory (/B/EXEC) and to maintain the calling and linking instructions within a command file. An example is shown in Figure 2.

```
ECHO "AIR COOLED HEAT EXCHANGER PROGRAM JULY 1980"
ECHO
%LOG THE USER, DATE AND PROGRAM USED IN THE CADLOG FILE
ECHO "ACE" >> /D/CADLOG
WHO AM I >> /D/CADLOG
%LINK IN THE DATAFILES
MAKLINK -F /LIB/ACEDAT.DAT ACEDAT.DAT
MAKLINK -F /LIB/DABANK.DAT DABANK.DAT
/B/EXEC/ACE
%NOW DELETE THE LINKS
DEL DABANK.DAT
DEL ACEDAT.DAT
```

Figure 2

A feature of these command files is that they surreptitiously log the user's ID, date and program used, so that the supervisor can check on usage if required.

SYSTEM MAINTENANCE

Providing a community of users with a computing service is not just a case of providing sufficient hardware, software and access. A considerable amount of time is taken up managing the systems to prevent accumulation of garbage and to allow the right people access at the right time. This is a duty which can only be done efficiently by having one person assigned as 'manager.' Inevitably, that person also becomes the first port of call for all the user's problems.

Examples of using CROMIX to help to run the system are shown in Figure 3, which lists two command files. The first, STRIPBAK, searches through the whole files system and removes all .BAK files. This is done

```
ECHO "STRIPPING ALL .BAK FILE FROM DISC"
MODE -PA
FIND / -NAME "*.BAK*" -A -PRINT -A -EXEC DEL { }
MODE PA
ECHO "DONE"
```

Figure 3A

```
ECHO "CLEANING ALL U/G PASCAL DIRECTORIES"
FIND /B -NAME PASSI -A -EXEC DEL { }
FIND /D -NAME PASSI -A -EXEC DEL { }
ECHO "FINISHED CLEANING PAS2"
FIND /B -NAME PASLIB.REL -A -EXEC DEL { }
FIND /D -NAME PASLIB.REL -A -EXEC DEL { }
ECHO "FINISHED CLEANING PASLIB"
FIND /B -NAME "*.SRC" -A -EXEC DEL { }
FIND /D -NAME "*.SRC" -A -EXEC DEL { }
ECHO "FINISHED CLEANING *.SRC"
FIND /B -NAME "*.LST" -A -EXEC DEL { }
FIND /D -NAME "*.LST" -A -EXEC DEL { }
ECHO "FINISHED CLEANING *.LST"
ECHO "DONE"
```

Figure 3B

once a week to free up space—users NEVER clean up their directories. The second command file, PASCLEAN, specifically cleans up the directories used by the students for compiling PASCAL programs. When things don't go as expected, students often hit the CTRL-C panic button. The effect of this is to leave intermediate files still linked to the user's directory. Apart from leaving unnecessary links in the files system, the users start to get worried when they list their directories and find unfamiliar files lying around. It is not unknown for them to experiment with these with the result that the system can lock up or crash.

On the two afternoons each week when the CROMIX systems are dedicated to teaching our first year students computing, it is essential to lock out all other users. This is achieved by the expedient of the command files, shown in brief, in Figure 4. These work by renaming the password file for general users and switching in a new password file for the first year students. To go back to general use, the process is reversed.

```
%THIS COMMAND FILE SWITCHES OUT GENERAL USERS
%AND LOADS A PASSWORD FILE FOR FIRST YEAR UNDERGRADUATES
REN /ETC/PASSWD /ETC/PASSWD.PT2
REN /ETC/PASSWD.PT1 /ETC/PASSWD
%NOW GIVE THE USERS THE OWNERSHIP OF THEIR FILES
CHOWNER ZHC5 /ZD/ZHC5
CHOWNER ZHC6 /ZD/ZHC6

    etc.

CHOWNER ZHE8 /ZD/ZHE8
CHOWNER ZHE9 /ZD/ZHE9
ECHO SYSTEM NOW RESERVED FOR PT 1
ECHO
```

Figure 4A

```
%THIS COMMAND FILE REMOVES OWNERSHIP OF FILES
%AND RESETS THE PASSWORD FILE TO THAT OF THE
%GENERAL USERS
CHOWNER SYSTEM /ZD/ZHC5
CHOWNER SYSTEM /ZD/ZHC6

    etc.

CHOWNER SYSTEM /ZD/ZHE8
CHOWNER SYSTEM /ZD/ZHE9
REN /ETC/PASSWD /ETC/PASSWD.PT1
REN /ETC/PASSWD.PT2 /ETC/PASSWD
ECHO "SYSTEM NOW RESERVED FOR PT II AND GENERAL USE"
ECHO
```

Figure 4B

The three systems we use are a mixture of ZPU and DPU systems. In addition, one machine has 5" discs, while the others have 8" discs. We try to maintain an identical set of software and directory structures on each machine for ease of management. This means that software has to be transferred by a suitable means. Machine to machine transfer with 8" is no problem with demountable volumes of floppy discs. There are two routes available to us for transfers to and from the 5" machine. The first consists of connecting two CROMIX systems back to back via TU-ART ports, using a cross-over cable, and letting the TELEMASTER software do the transfers. The other option is to CDOSCOPY from the 5" CROMIX system to a C-10 and then TELEMASTER from the C-10 to the host 8" CROMIX. This also works well but is rather more involved. The C-10 is also connected via a switch to the University's mainframe IBM 370. Software written by our Computing Laboratory allows the C-10 to be used as a batch card reader for data entry, completing the CROMIX to 370 link.

Our major problem in system management is backup. All backups are taken on double density discs, but the BACKUP and RESTORE utilities have not been used as they have been found to be unreliable and inconvenient. The options with the COPY and CPTREE facilities within CROMIX allow that changed files are the only ones that need to be copied at each backup session. Even so, the process is slow and can run to using a number of separate discs. So far, we have found no easy answer to the problem.

SUMMING UP

We have found CROMIX to be an ideal system for use in teaching and research where a multitude of different tasks are to be performed, ranging from using various languages to computer aided design and computer assisted learning. The systems are sufficiently efficient and easy to use for undergraduate use and the facilities offered by CROMIX make the task of managing the systems for a community of 150 users easier than it might otherwise be.

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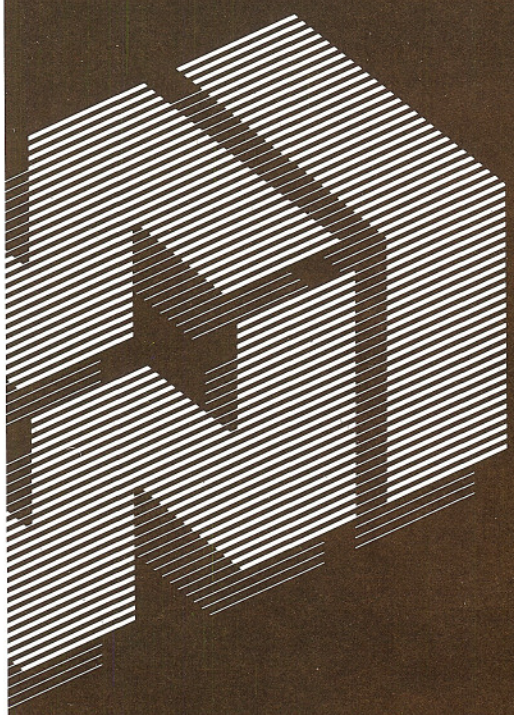

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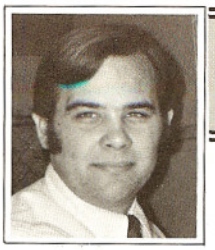

tec·tips

TEC TIPS is a regular column aimed at providing hints for keeping systems up and running. It will not attempt to deal with specific engineering applications or non-standard configurations. TEC TIPS is edited by Richard Quinn, owner of QUINTEC, a Southern California Computer service firm.

Editor's Note: This installment of Tec Tips was transferred from QUINTEC at 1200 baud from a CROMIX system using a UDS 212A modem and McsTERM communications software. It was received at I/O News on a C-10 system with a D.C. Hayes Smartmodem, utilizing ProCall communications software.

New RDOS Chips Available

There is a new version of RDOS that allows users to boot directly to their hard disk drives. The version number is 3.08 and can be plugged into the 64FDC to give this additional feature. For use with a 16FDC there are some jumpers that must be installed at the time the ROM is plugged in. I'll have that information in the next Tec Tips after I've had a chance to test it.

The RDOS is designed to work with the latest versions of CROMIX (latest releases are 11.24 or 20.56). RDOS 3.08 has the ability to write a boot to the hard disk drive. Use the **wboot** utility to write the boot to the various devices. I'm not sure how the warm up for the hard disk will work out with this latest RDOS. In general, it is best to allow 15 minutes or so of warm up before booting to a CROMIX hard disk. We shall see.

RDOS 3.08 can test all banks of memory in a CROMIX system in the same way that RDOS 2.XX checked the system bank. When the "T" command is used, it will also let you specify a hard disk drive to be tested. This will greatly aid quick trouble-shooting and quick system startups.

Some have wondered what the various versions of RDOS represent. Series 1 (versions 1.0, 1.1, 1.2, 1.3) were for use with the 4FDC, Cromemco's single density disk controller. With series 2 (2.01, 2.52) came the double density 16FDC and 64FDC controllers. Version 2.52 allowed boots from any drive (A, B, C, etc.) and recognized the Tandon 8" disk drives. The latest version, 3.08, allows boots to the hard disk without the use of the boot floppy and tests all banks of memory in CROMIX.

With the changes in RDOS came different controllers. The 4FDC, the original floppy controller, was single density only. With proper jumpers installed it could do double sided. The 16FDC came later and could do both double sided and double density. In addition, the 16FDC had its own data separation circuit and did not require one with the Persci drives. Both the 4FDC and 16FDC were designed to work with the Persci disk drives.

A temporary disk controller was shipped with some of the early System 3As. They were redesignated CS3A when their cabinets were remodeled to allow for increased air flow, and the Tandon 8" drives were added. Cables and power supplies were also changed and 16FDCs were modified to be compatible with the Tandon 8" drives. These were called 16FDCTs and were virtually the same as 64FDCs except that the controllers were hand-modified for the Tandon 8" drives.

Any 16FDC can be turned into a 16FDCT if a change of drives is desired. If you are upgrading from a 4FDC, I recommend installing a 64FDC and Tandon TM848/2E drives. If, however, you already have a 16FDC merely upgrade it to a "T" and it will work just like a 64FDC.

Five inch disk drives will work the same on any of the cards and should need no special modifications.

Most Common Failures

Many have wondered what are the best spare parts to stock to cover most common failures. The following information is based on my experiences only and does not represent any formal study. I will break down failures by types of devices, i.e. cards, disk drives, etc. (Jump to the end if you don't want to know how I arrived at the recommendations.) Often, it is less expensive to keep a few spare cards around for quick diagnosis/repair, than to maintain high cost service contracts.

I will discuss **revision levels** (usually etched on the solder side of the board in the area of the voltage regulators), and **mod levels** (the modification level is usually on a small tape tag on the solder side). It is important to check both to know where you stand on a card's reliability. Mods are done by hand and usually involve several jumpers or component changes. Mods should not be looked at as patched cards, but as problems solved.

By far the most troublesome cards were the older 64KZs. This was due partly to design and also because memory cards are the most complex, and contain the most dense concentration of chips. Any 64K memory card with a revision level less than J1 should be upgraded. The desired mod level is 10, and certainly if the card is less than mod level 4 it should be upgraded. The big difference was the delay line that eliminated some unreliable circuits.

If the card is a revision E, G, G1, or older, Cromemco will replace the card rather than repair it. The replacement card is a 64KZ-2 which is a great card and does not suffer any of the earlier problems.

Some of the older memory cards had loose sockets that were bound to cause trouble. The latest version of these cards has high pressure contact sockets and are generally just fine. These sockets are identified by their large, broad contacts and tight hold on the chips.

Sometimes simply pushing the chips down would cause the card to start working. Cards like this should be tested with a flexing test using the 64KZ test to detect errors. Troublesome sockets should be removed completely and the chips soldered directly to the board.

We have removed all sockets on many of these boards, but this can only be done with special desoldering equipment. **Don't** try to use a "Pullit" or other suction device. **Only** a power desoldering machine will prevent major damage to the card, and even then it may be cheaper to replace the card than repair it.

Another area of common failure for the 64KZs was found in the voltage regulator attached to the large heat sink. It should be checked with the card at operating temperatures and with all other cards in the system on the bus. This card liked those voltages very close to +12 and +5 volts.

The older 64KZs may work fine in CDOS systems and I would be less concerned with upgrading if they are currently working. Symptoms of a bad card in CDOS are "invalid jumps," simple system lockups, or dying. They may also be heat sensitive when the problems increase on warm or humid days. In CROMIX, system lockups are most common. One other problem for the 64KZs has been the power bus along the bottom of the card. This is a long white strip with various connections to the card. It distributes both power (+5 volts) and ground connections to the card. Bad connections would form, in particular on cards where this strip had been bent or pushed over. Jumpers on the solder side of the card are the best repair and a flex test is the best way to find the problem.

After the 64KZ, no other cards jump out as real problems. The WDI card has lots of troubles, but unlike the 64KZ it is not because of design problems. Failures in hard disk drives, their power supplies or associated hardware frequently damage the interface chips on the card or drive. The most frequently damaged chips are the 75138s which are close to the cable connector. The same chips are on the WDI-2 and suffer similar damage. Systems using the IMI 7710, 11-mb drive are common sources of trouble, and this is usually due to the power supply for the hard disk drive.

This power supply should have the power plug removed from the power supply end of the power cable and likewise replace the drive end connector with a "Molex" brand connector. I cannot tell you how many of these connectors I have replaced to cure intermittent drive problems. The power pins on the hard disk drive should be retined with a hot iron and a damp cloth.

After these cards, any card interfacing with the "outside world" (with devices like CRTs, printers, disk drives, etc.) are most frequently damaged. Like the WDI, the interface chips are the most commonly damaged. This is because these chips are designed to protect other devices if high voltages or currents occur. The most common chips damaged are the MC1488, MC1489, 75188, 75189 and 75150. When these chips fail, they most often kill the chip on both the device end and the computer end. Transient voltages and ground faults are the most common causes of failure. The cards using these chips are the FDCs, TUART, SCC, Quadart, and Octart. Although the PRI uses different chips, it too suffers from these problems.

Damage is rare in these devices in systems that have been working without changes or problems. Damage most often occurs during lightning strikes, power failures, static electricity on carpets, or when equipment is moved or installed.

Disk Drives

Without a doubt, the Persci 299 disk drive is the most often repaired drive. On each side of the drive is a floating head, head 1, that is spring-loaded to hold the disk between the heads. But this head is easily pulled loose when a diskette jams or the eject works improperly. Something as simple as a bent diskette can damage the head.

The next most common problems with the PerSci drives are the index and position sense lamps which are "grain of wheat" incandescent lamps. They burn out and require replacement—with alignment—to work again. If PerSci had just used LEDs this problem would have been solved. Many users keep their systems on all the time to prevent stress to these lamps. This helps, but it really depends on how many hours a day you use the system whether you should leave it on or not.

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The 299 also suffers from bugs in the eject mechanisms. Pinch hubs gave regular problems. Even a drive mounted in the System Three incorrectly could cause a diskette to be ejected into the back of the computer door causing damage. I've come to hate the auto eject on these drives because they cause so much additional damage when something goes wrong. Besides, how much energy does it really take to eject a diskette from a drive. (Computer operators get precious little exercise anyway!) A simple, manual system like that offered by Tandon causes far fewer problems and adds much less to the original cost of the drive.

Many who are tired of the PerSci ailments have reworked the System Three to turn it into a pseudo System Three A. Turn the 16FDC into a 16FDCT, cut the front of the computer to accept the Tandon drives and modify the power supply for the Tandons and be done with PerSci forever. PerSci is now out of the business of manufacturing disk drives and, while parts and service are still available, it may actually be cheaper to replace than repair. In addition, you'll avoid those repair costs that occur every 6 months or so.

Many have asked me why Cromemco went with the PerSci drives. Remember, Cromemco made the choice when PerSci was the only show in town that could offer a quality, high-speed, 8-inch drive. Many other manufacturers used them as well. But, as steppermotor technology improved and cost became more important, other manufacturer's products became better. Don't judge yesterday's machines by todays technologies. Remember, most who made computers during the Cromemco System 3 era (prior to the 3A) are not even around to talk about it. IMSAI, Altair, SWAT, and others don't have to keep their machines in line with today's standards because nobody is using them anymore. But thousands of Cromemcos, using yesterday's technology are still in service. Upgrades are still cheaper than replacements, and that is the best way to solve some of the reliability problems with old systems. But at least you can upgrade your basic system. Not many computer makers have this capability and this is one of the main reasons I buy Cromemco.

PerSci 277 drives, while somewhat more reliable than the 299s, are still in frequent need of service. In addition, they are only single-sided, and while some will do double density, they will not all work equally well. Most users have upgraded to 299s or Tandon.

Hard Disks

In hard disk drives the older IMI 7710s were the big troublemakers, but because Cromemco had an upgrade program for these drives (at their own expense even though the problems were IMI's) it has been a long time since I have seen really bad 7710s. Also, when the systems were run correctly and the power plugs were replaced, (see comments above) even some of these old drives were very reliable. I have an old one in my system that has served without a glitch for years and shows no signs of giving up.

The main upgrades on these drives were the automatic head locks on power-down. Also, the electronics were greatly improved along with the motors as newer drives developed. These newest drives were fast, reliable and quiet. I would never recommend replacement of a good working 7710. If additional capacity is needed, add another drive to it. It will work fine with any of the newer drives (5 mb, 21 mb) and can serve as a fast root device. An upgrade to the WDI will be necessary if you use drives other than the 7710, but the WDI-2 will work fine with the 7710. Newer HDD-11s were even shipped with the WDI-2.

For reliable operation of the HDD-11, HDD-22, or the Z2H systems, the MOST IMPORTANT change is to replace the power plug on the drive and remove the plug on the power supply itself. I can't overemphasize the importance of this change. The use of insulation displacement connectors was a poor choice for these units, and will eventually cause a drive to be unreliable. In addition, damage to other components will be caused. Problems are especially noticeable in systems that run hot (fully loaded Z2Hs or HDD-22s), or are in humid environments.

For a short time the HDD-5 was being used. This drive suffered from a poor design in the index sensors. The LED reflected off a foil patch in the drive which would fail as soon as dust built up. The cure was an upgrade kit supplied by Cromemco for a different index assembly. This should be done to all of these drives. In addition, improved software drivers corrected for drift in these units and should be considered part of the fix. (Use CROMIX 11.16 or newer, 20.14 or newer, CDOS 2.52 or newer. Current are 11.22, 20.56 and 2.58.)

The HDD-20 is a rock. I wish it were faster because it is so reliable. There are no common problems with it and it reflects all the years of learning on other drives. It is currently Cromemco's only hard disk offering.

Miscellaneous Hardware

In mainframes, by far the most common problem is with the older Z2Hs. (If you have a CS-2H don't worry). The problem was with the power connector on the mother board, ironically the same type that gives trouble on the IMI 7710 hard disk drives. REMOVE THIS PLUG COMPLETELY. Solder the wires to the mother board after removing the connector from both the board and the cable. This should be done whether you are currently having problems or not.

The problem shows up as a system that dies when hot or just at random times. If you see a darkened power plug on the back of the five-inch floppy voltage regulators, you know you have the problem. As the connector fails, ground is established through the power connections to the five-inch drives and then to the system through the ribbon cable connector and the FDC. This causes damage to the disk drives, the connectors and can even cause a burn-out at the mother board connector causing other card damage. This is a shop job for a qualified repair person, but is well worth the time and money. This is the only major, regular and predictable problem with any of Cromemco's mainframes.

Other things to check are bad fuse holders (feel them for hot tops after the system has been on for an hour or so), or bad connections on

power diodes. If there are bad connections on fuses or diodes, cut the clips off and solder the connections. Look at all connections in the back portion of the computer for dark or burned wires and repair as necessary. These will more likely be in fully-loaded systems (CROMIX, graphics systems, or the like). The power supply has to work harder in these systems.

Older mother boards in all systems had loose connectors. If your system goes down, and popping the cards in and out brings it back to life, replace the mother board. The cost is low and the newer boards have a very high pressure contact which never has a problem. Bad contacts show up most often in hot running or humid environment systems.

The new mother boards have some improvements for bus noise and also have a set of LEDs to show you that all power supply voltages are present. Mounting is the same as on all older systems.

Summary

So, I've said all of that to say this: the best cards to keep as spares are:

1. A spare memory card (64KZ-2 or 256KZ) because it is vital for system operation and the most complex, thus the most likely to fail;
2. A spare floppy disk controller card (16FDC or 64FDC) because nothing else will work without it;
3. A TUART card (if your system uses them) for use with the printer or other CRTs;
4. Less important because it rarely fails would be a ZPU (or DPU if a CROMIX D series machine), and last but not least;
5. Two sets of spare fuses for all devices. If you're handy with a voltmeter and soldering iron stock spare voltage regulators and the "sacrificial" chips listed above.

If you're afraid of the system, stay out of there!! Remember, a simple system check is only an FDC, a ZPU and a memory card. This will get you access to RDOS or allow you to boot CDOS for diagnostics tests.

Spares you stock depend a lot on the system you have. Consult your dealer before making a final decision.

What are my favorite boards? In order of their age, oldest first, the ZPU (it's reliable as a rock), the TUART (Cromemco says it's the all-time best seller), the 64KZ-2 (cool, runs without a glitch), the 256KZ (most card for the money—use with Z-80 or 68000 systems and reliable from the beginning). The funnest cards are the graphics cards and newer versions are very reliable. Those are my opinions. Write and tell me yours.

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Soft Tips

SOFT TIPS is a regular column aimed at providing software oriented hints and ideas for non-programmers. Members are encouraged to send in tips that can help a user better use his/her system. SOFT TIPS is designed to put forth ideas that are general in nature. The column is edited by Norman Vadnais, President of **Computer Specialists & Associates,** an Orange County Customer Support Specialist. Member's contributions can be sent to SOFT TIPS in care of I/O News. If you wish to discuss your software situation directly with Mr. Vadnais, he can be reached at (714) 841-3620.

Editors' Note: This installment of Soft Tips was transferred from CS&A at 1200 baud from a CROMIX system using a UDS 212AD modem and ProCall communications software. It was received at I/O News on a C-10 system with a D.C. hayes Smartmodem, utilizing ProCall communications software.

LETTING CROMIX RUN YOUR SYSTEM

CROMIX offers two methods for running a preset series of commands every time a user logs on to the system. These startup command sequences are very valuable to your operation of CROMIX. The two methods offered are an initial command associated with the user while creating the user with the **passwd** utility and a personal 'startup' file in the user's home directory.

Every time a user logs on to a CROMIX system, CROMIX looks to see if a command line was associated with the user when the user was created. If a command line was associated with the user, the command line will be run as if the user typed in those commands. When the command line is finished executing, the user will be automatically logged off the system. This procedure is handy for people who are using the computer as a business machine and are using the system for one particular task. This will prevent these people from accidentally getting into areas they were not intended to explore.

If no command line was associated with the user when he was created, CROMIX will then look for a **.startup.cmd** file in the user's main or 'home' directory. If this file exists it will be executed before any other operations are allowed by the user. When the command file finishes execution, the user will be presented with the standard CROMIX prompt. This is the main difference between commands associated with a user in the passwd utility and the .startup.cmd file. An example of a .startup.cmd file is presented below.

SYSTEM PROGRAMMERS CORNER

Editor's Note: For those who dabble in assembly programming and operating system details, the System Programmers Corner will try to keep you informed and offer you a forum to discuss your findings. This section, however, will only offer operating system type features and hints, versus the latest sorting algorithm. If you have any ideas to contribute to the SPC, please forward them to SOFT TIPS, in care of I/O News.

Have you ever thought of having your custom application spool its output rather than outputting it directly to the printer or to a separate file the user has to spool? The following will tell you the various steps that are performed in spooling a file. The spool utility takes your input file, creates a special copy of it in a special directory, and executes a special program that prints all special copies it finds in the special directory. Sound simple? It's not that hard!

If you wish to design an application that spools its output directly, the first thing to note is the **/usr/spool** file is only accessible to **bin.** Any application that wishes to spool output will have to change to user bin while it operates in that directory. To start your spooling, you should output your file in the special format. The special format is simply a 48 character (30 hex) information area at the top of the file. This information area is primarily for use of the listing option of the spool utility (spool −l or spool −la). The bytes and their values:

0-23	Spooled outputs name
24	Null
25-26	Sequence number
27	Spool flag (MUST BE SET TO 2!)
28	Priority number
29	Null
30-31	Owner's user number
32-36	Output device name
37-40	Null
41-42	Number of pages to be printed
43-44	Number of lines to be printed
45	Number of copies to print
46	Major device number of output device
47	Minor device number of output device

The main two locations of the information area are byte 27 and byte 45. Byte 27 must be set to a two (2) for proper operation: this signals that the file is waiting to be printed. Byte 45 must be set to the value desired, if it is left as a zero (0), the spooler will interpret it as 256 and print that many copies!

After outputting the header information, you may output your desired printout as if it were going to the printer. Remember, the modes of the printer will be handling your printout when the spooler is initiated. When your output has been completed, the file needs to be renamed and placed in the /usr/spool directory. The name of the file must be of the form sqWWXXYZZZZZ, with the letters representing:

WW	Major device number of output device
XX	Minor device number of output device
Y	Priority number for this printout
ZZZZZ	Sequence number of this printout

Your program will either have to know this information ahead of time or obtain it while running. Standard priority number is 5, and this will match the spool utility used without options. If you wish your printout ahead of others, lower the priority. The sequence number is used to prioritize printouts with the same priority, and is a decimal number. To follow the spool utility, you should read the sequence-number file to get the system's next number. It is important that the sqWWXXYZZZZZ file be owned by bin.

The last step is to start the CROMIX spooler. Avoiding unnecessary detail, the command line you need to execute at this point is "**shell −q daemon <device name>**". Make sure the device name used matches

the device number placed in the filename. This will spool your output and delete the file when it is finished.

OPERATING SYSTEM UPDATES

If you are a SUDS subscriber, you should have recently received an update of your operating system, whether it is CDOS, CROMIX, or CROMIX-D. All of these systems offered many exciting new features for their respective users.

The new CDOS being shipped, version 02.58, seem to have fixed most of the bugs involving the various hard disks offered by Cromemco. Many users had not been using previous updates since their various hard disks were not being used properly by intermediate versions. These people should now feel safe to upgrade to this new version.

The new CROMIXs being shipped, version 11.22 for 8-bit and version 20.56 for 16-bit, have many added features. A major change is the new simulator, which has really been cleaned up for both speed and compatability. An in-house application that ran in 160 minutes under the old simulator will now run in 123 minutes under this new version. The new version is also compatible with such things as dBASE II vers. 2.4 and other CP/M 2.2 compatible programs that previously did not work.

A new utility, **flush,** was also added in this new release. This utility updates all disks on your system every specified number of seconds, with a default of thirty seconds. Though CROMIX normally flushes all files when they are closed, it does not flush files that remained open during a system crash of files left open by an aborting program. By flushing the disk buffers every so often, most of the problems the **check** utility reports after system crashes can be eliminated.

The most thrilling added feature is, unfortunately, available only to users of the D-Series CROMIX. CROMIX-D now includes ram disk drivers, allowing users to allocate chunks of memory in 64K allotments to any of four ram disks. Once the system is booted, these ram disks are like any other disk, and can be mounted into any area on the system. They can be used to hold common utilities, overlays for large programs (for dBASE II and WordStar users!), or used as high speed work areas for other applications. A very nice addition indeed!

HANDY COMMAND FILES

We offer here a short example of a **.startup.cmd file** for use as described above under 'Letting CROMIX Run Your System.' Our example is exactly that, a simple example. The .startup file can be used to provide special messages on various days (using the day utility), immediately executing the command most often run by a user, running a program that maintains access information (for billing purposes if your system is a time-share), or any other application you wish to run automatically upon 'login' of a user.

Our example starts by reminding the user of any mail he may have previously asked the system to save for him. Then the modes the user does not like from the standard system setup are changed to this user's preference. Lastly, a special escape sequence is echoed to the terminal to set one of its special features for this user.

Next time around we will discuss the reverse of this process, how to turn off features set by individual users when they logged on.

Name: .STARTUP

Purpose: Executes a preset list of commands every time a user logs on to the system. The following is an example only, any commands could be placed in this file.

Setup: Our example includes a .mail file, which had the contents:

```
Your previous mail was —>
<a blank line>
```

Remember, this was only required by our sample and is not necessarily a setup requirement.

Listing:

```
if –r mbox ty .mail mbox
/bin/mode –im
/bin/echo '^[>'
```

Notes:

The command file starts by checking to see if a mbox (mailbox from the CROMIX mail utility) file exists in my directory. If it does, our special .mail file and the mbox contents are displayed on the screen. The immediate echo mode of the terminal is then turned off, since this user does not like the general system setting of echo mode on. The final command sets a special feature on the terminal for this user, specifically the key click option of a TeleVideo 925 terminal.

Example:

```
Login: norman
Password:
Logged in norman Mar-01-1984
  12:34:56 on tty1
Your previous mail was —>

---------------------------------
From norman, Feb-01-1984
11:38:46
You need to fix the strip program
for more general use!!!
%
```


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Close Encounters of the C-10 Kind

Close Encounters of the C-10 Kind is a regular column directed to users of Cromemco's personal computer, the C-10. It is edited by Dr. Tom Beer, of Applied Environmetrics, located at 118 Gordon St., Balwyn, Victoria 3103, Australia. Dr. Beer can be reached by phone during business hours at 8180264, and at home at 8022571.

TecEd's Note: We are happy to introduce a new column to I/O News: Close Encounters of the C-10 Kind. It is edited by Dr. Tom Beer of Australia (far, far away from our home office). Users interested in submitting editorial material regarding the C-10 should send it to I/O News, in care of Dr. Beer. We will forward the material to Australia for review.

This introductory column is comprised of two articles submitted by Dr. Beer. Please be aware that some of the material is dated, as more recent releases of C-10 software have rectified most of the peculiarities noted herein. It is presented here for a more historical perspective. Future articles promise to be more timely.

FIRST ARTICLE

This column arose as a result of loneliness. There are too few articles or columns being written about the C-10 personal computer. I have now been the proud owner of my C-10 long enough to know some of its attributes as well as deficiencies and this knowledge may prove useful to other C-10 users.

There is no doubt that the machine is technically excellent. The original software leaves something to be desired and bears all the hallmarks of a rushed job. I have no doubt that part of the problem is that Cromemco had some trouble defining their potential market. Their normal range of computers is definitely up-market and intended for sophisticated users. The C-10 is, however, likely to end up in the hands of both experienced Cromemco users, and also neophytes to the world of computers who purchase it because of its good performance to price ratio. This second group may find it hard going if they want to do more than just play with the software that is supplied with the original purchase.

Most purchasers will, like me, have purchased the C-10SP that comes complete with keyboard, screen, one disk drive, two disks (a system disk and a backup) and a host of assorted manuals.

SOFTWARE

Systems disks with serial numbers greater than 2-10000 are supposed to be supplied with updated software. If your serial number is less than this but you paid the money to join SUDS (Software Update Service) then you should receive a diskette with new software. Nonetheless, I have found that at least one of the faults that was supposed to be fixed still occurs. Occasionally when I use COPYDISK, I find that the machine hangs during the disk formatting phase. This always occurs on cylinder = x, surface = 0, where x is an even number.

APPLICATION NOTE

I received two application notes with my C-10 when I bought it in June, 1983. Their titles were:

Attaching a Printer to the C-10

C-10 Video Attribute Selection

Both of these were dated 12/22/82. The C-10 has four character sets available which can be viewed by a program called CHARSETS. If CHARSETS is called up via the user friendly menu then it flashes on the screen for about ten seconds and then flashes off again. Drives you mad. I finally worked out that the trick was to get out of the menu and then type CHARSETS whereupon they would stay on the screen. However, I now found myself going blind trying to work out how the individual characters were made up. Between visits to the optometrist I determined that a complete pixel is made up of 9 horizontal lines stacked one on top of the other, but my eyesight was too poor to work out the number of vertical lines. Crazed and myopic, I rang my local dealer. After a few phone calls I was informed that there was an Application Note about character sets, as well as a few others. Would I be interested? Having affirmed my interest, a bundle arrived in the mail:

Customizing the C-10 Menu (06/07/83)
Using the C-10 Character Sets and Terminal Functions (04/04/83)
C-10 Cable Specifications (03/16/83)
Using the C-10 with Another System (01/18/83)
C-10 Connector Descriptions (04/20/83)
C-10 I/O Port Assignments (04/18/83)
Creating C-10 Diskettes (04/18/83)

If you are astute enough to work out the fiendish American date system, you will see that a fair few of these should have been supplied with the original purchase.

Rumor has it that Cromemco intends to bind all these gems of wisdom into a technical manual. [Editor's Note: The Technical Reference Manual is discussed further on.]

THE KEYBOARD

A nice light little production. Those of my friends who own a C-10 keyboard all seem to have one key that sticks. It's the alpha lock key on mine. Others find the number 1 key sticky. Unscrewing the casing and shifting it around a bit may help.

DISK DRIVE

The model CFD disk drive is very nice. Two of them are very, very nice because you can accomplish disk transfers that much faster. There is a little red light that comes on when the drive is being interrogated, but the life of the bulbs is reputed to be quite short. My wife and children all got an unwanted introduction to CROS (the Resident Disk Operating System) the first time we tried to use the machine. Not being a family given to reading instruction manuals, we plugged

the machine in, turned it on, rammed a system disk in the drive and hung around expectantly waiting for fireworks. Instead, CROS introduced itself. We had forgotten to close the latch of the disk drive. Well, forgotten is the wrong word. It is a very, very black latch. And the lighting in our place is not the best. We just didn't see the thing.

We now know that the solution to these little problems is to (1) close the latch, and (2) type B. This is the CROS command to boot (you will find it in Appendix B of the User manual). You may also meet CROS if you have the wrong version of CDOS.COM on your disk or if the systems area of your disk is blank. I have a tendency to pull out the disks too early during a COPYDISK operation, due to a nasty combination of eagerness and mistrust, so that there are occasions when the systems area has not been copied. The solution to these two problems is more complicated and will be covered in a future column.

THE TERMINAL

There are a goodly number of wierd and wonderful things that one can do with the terminal. I will deal with these in future columns.

FILENAME EXTENSIONS

The C-10 manual mentions that there are reserved filenames but does not explain what they are for. I hope the following are of help.

.COM — This filename extension denotes a file that can be directly executed under the CDOS operating system (CDOS is an acronym for Cromemco Disk Operating System, and is Cromemco's answer to CP/M). For example, when one types MENU the operating system searches for a file called MENU.COM, loads it and executes it.

.CMD — Is the filename extension for batch command files set up for use with the batch utility described on page 99 of the C-10 manual.

.REL — Is the filename extension for a relocatable binary file. These types of files are used if you have FORTRAN programs or ASSEMBLER sub-routines that need to be linked.

.BAK — This file name extension is automatically set up when you exit and update from WriteMaster or the SCREEN editor. It denotes the backup file. If you are prone to leaping into SCREEN, changing files, then deciding that you made a mistake, you can recover the original version by renaming the .BAK file.

.SAV — This has nothing to do with BASIC files, but refers to files set up using the CDOS command SAVE (Yes, it works on the C-10). This command is the one that allows you to save half-finished chess games for later execution.

.$$x — $$ extensions are temporary files set up by programs like SCREEN to hold its workings. If, for example, you try to update a write protected file then SCREEN will not change it, but set up a new file with the same name and $$1 extension.

.Z80 — Is used for assembly languages programs.

.FOR — Is used for FORTRAN language programs.

Various programs use filename extensions for particular purposes. Many of these are fairly obvious. HLP usually refers to a help file. dBASE II sets up files with the extension .DBF to indicate a Data Base File. Life can, however, get a little confusing because dBASE II uses .CMD to indicate dBASE programs. In situations like this you are obviously going to have to keep track of which CMD files are CDOS command files and which CMD files are dBASE program files.

SECOND ARTICLE

The two exciting happenings since the last C-10 column have been the arrival of the Release 3 software and the arrival of the C-10 Technical Manual.

RELEASE 3 SOFTWARE

According to Cromemco, Release 3 software has been sent to all registered users, whether they subscribe to SUDS, the Cromemco Software Update Service, or not. This means that if you have not yet received it, you should either send in your registration form or write and point out that you seem to have been overlooked.

Release 3 software corrects many of the problems about which I complained in the last column. So far, for example, COPYDISK has not

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CD

hung during its initialization phase. In addition, it explicitly tells you when the system area has been copied, by first loading the disk to be copied, reading its system area and then copying this onto the new disk. As I pointed out in the previous article, you cannot automatically boot the C-10 if the disk that you insert has a blank system area. Under Release 3 COPYDISK (which is version 01.26) this is less likely to happen.

I was particularly impressed that the box containing the Release 3 software—two disks, original and backup—also contained the four manuals: C-10, SBASIC, WriteMaster and PlanMaster manuals, although some of the information in the new manuals pertained to the older software versions.

The incorporation of command files—which are a sequence of CDOS commands linked in a file with the filename extension .CMD—has also enabled the C-10 version of CDOS to incorporate the startup feature found in many other versions of CDOS. Any bootable disk that contains a file called STARTUP.CMD will have that file executed before the C-10 calls the menu. At first, I thought that this feature, along with some knowledge gleaned from the technical reference manual would enable me to automatically adjust the terminal brightness on booting. More about this later.

TECHNICAL MANUAL

The long awaited C-10 Technical Reference Manual is a mine of information that all serious users of the C-10 will need to possess. It has eleven chapters, though some of them are amazingly short. Chapter 1, for example, is two pages which tells you about the wisdom to follow, and the CP/M upward compatibility of CDOS. (CP/M programs will run under CDOS, but not vice versa). Other chapters are: Keyboard and Terminal, CROS, Introduction to CDOS, CDOS Commands, System Structure, CDOS System Calls, Hardware, Keyboard, Printer, and Disk Drive. However, there are 19 appendices which incorporate the application notes mentioned in my previous article. The appendices are most useful.

The Technical Reference manual is a mix of both hardware and software in moderate doses. The wiring information is vital if you subsequently purchase a printer or a modem. Similarly, the list of escape codes is vital to all programmers. Most versions of BASIC come supplied with a command that will clear the screen. Cromemco Structured BASIC does not have such a command, but the same effect is produced by defining the escape sequence Clsc$ = Chr$(27)+"E" and then printing Clsc$ whenever one wishes to clear the screen, i.e., PRINT CLSC$. Incidentally, the reason that this is known as an Escape sequence is that Chr$(27) is the computer code for the ESC key. However, Escape sequences only work properly if they are printed out by the computer. It does you no good trying to press the ESC key and the E key while running a BASIC program [unless you press the CONTROL key and the ESC key simultaneously]. Strange things may indeed happen, but they are unlikely to clear the terminal screen.

Advanced BASIC programmers will find the list of CDOS system calls to be invaluable. Fortunately, the BASIC manual provides an example of their use if the description of the USR command and the complete list in the technical reference manual will increase programming versatility. Possibly the most useful is CDOS system call 6 which can be made to perform the INKEY$ function of the TRS80. This will make the vast TRS80 BASIC games literature convertible to C-10 BASIC.

MIXING RELEASE

One can achieve an interesting effect with a disk that has Release 3 CDOS on it but the Release 2 menu program. It becomes impossible to exit from the menu without changing the disk.

GOOFS

It has been pointed out to me that the .SAV extension is for files saved from BASIC. It indicates a semi-compiled file as opposed to an ASCII file. It has nothing to do with files created with the SAVE command of CDOS (described on page 60 of the technical manual). Those files are simply dumps of the memory and would normally have an extension of .CIM (Core Image Module). Many thanks to Jeff McNaught at Cromemco for pointing this out.

[TecEd Note: BASIC does not automatically add an extension to a filename. There are two ways of writing a program to the disk: by use of the LIST command and by way of the SAVE command, both of which are BASIC commands. LIST will save the program as an ASCII file, and SAVE will save the program in a semi-compiled form. A program that has been LISTed must first be ENTERed, and then RUN. A program that has been SAVEd can be RUN directly. Therefore, it is useful to SAVE programs with a .SAV, to distinguish between those that have been LISTed. The convention used is entirely up to the the user.] CD

Palo Alto, California, the nerve center of Silicon Valley, is finally getting a Cromemco users' group. This group is so new, it does not yet have a name. Contact Emily Ott at (415) 854-5818 for info on formation meetings. With the numbers of experienced users in this region, this group could quickly become a prime organization.

Bavaria, West Germany marks the first group formed in that part of Europe. Cromemco activity levels are very high in this region, and the group offers fluency in both German and English (with a definite American accent). For info contact Glynnis Long by phone at 09383-1237.

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Good News for Canadian Users

Many parts of Canada have been without proper dealer representation for quite some time. That is changing with the opening of two, new dealerships; one in Calgary, Alberta, the other in Ottawa, Ontario.

Computer Solutions in Calgary is managed by Bob Pyle, a long-time Cromemco user and IACU Member. Pyle has, on many occasions, exhibited a sophisticated degree of knowledge of both hardware and software. His dealership should prove to be a boon to our Western Canada members. The phone number at Computer Solutions is (403) 286-8459.

Eastern Canada will be served by **D.E. Systems Ltd.,** headed by Bruno Dugas. The phone number for D.E. Systems in Ottawa is (613) 729-5164.

Best of success to you both.

CRAMPER Plans Crystalizing

CRAMP, the CRomemco cAMP introduced in the prior issue, is taking shape. The first of what could become an annual event is scheduled for the last part of September, probably the weekend of September 21-23. Two sites are under consideration; one in the San Bernardino mountains, the other in Malibou Canyon. Both are ideally situated in Southern California to delight CRAMPERS.

While CRAMP is designed to attract experienced users with a combination open forum and workshop format, organizer Richard Quinn promises the intensity of the subject matter will be interspersed with lumberjack breakfasts, Western barbeques, a Mexican Fiesta, and campfires with skits.

Workshop topics will include: **Hardware: Present & Future; Software: Operating Systems, Applications Packages** including **Business, Engineering, Programming Languages, Systems Utilities,** and **Special** or **Unique Applications.** Systems will be provided for demos, and a selection of new items will be available for sampling. Attendees should plan on bringing any original hardware or software they would like to share with fellow CRAMPERS.

The total number of attendees is limited to 50, including participants, and advance registrations are recommended. As of this writing, only about 30 more can be accommodated.

To make reservations, write or call: CRAMP c/o QUINTEC, 30313 Canwood St., Agoura, CA 91301. Or, phone Richard Quinn at (818) 889-4819.

Critical Path Software Sought

An Australian firm engaged in engineering management and planning is looking for any critical path project management planning software packages to run on its System 1H with 20 mb hard disk. This is a Z-80 based system, so the amount of available RAM is limited.

Some of their goals are the ability to run "precedence and/or arrow" networks; the ability to interface with WordStar, dBASE II, and QuickCode so that special reports can be designed to their clients' particular needs; and the ability to generate standard reports such as summary reports, task description reports, network chart/graph, and tabular job reports. Whew! That's quite an order. Anyone out there want to tackle this? If so, contact I. Kosowitz, System Manager, P.F. Booth & Partners, P.O. Box 114, South Perth 6151 Australia.

Another area where they are having problems is with slowdown when two or three users are using WordStar simultaneously. This is a rather common complaint and if anyone has a reliable fix for it, we'd like to print your solution—or at least your name and phone number so we can let others know of your genius.

One word of caution before you go rushing off to Australia: they are using Hazeltine terminals. How about it, systems experts, can you respond to this challenge?

Kudos for Gunn

Dr. Robert L. Andresen, Research Scientist with General Electric in Schenectady, New York, recently wrote that he is using three offerings from Gunn Enterprises and that all rate excellent or higher. The products are the CDC 35 mb hard disk, the CDOS-CP/M simulator, and Custom CROMIX & Utilities.

It is especially rewarding to receive letters of this type, as most correspondence deals with problems rather than solutions. It seems that when things are going well, most users are too busy using their systems to take time to let us know how well things are going.

Dr. Andresen also asked if we would like a more elaborate review of these products. The answer is: a resounding YES, quickly followed by a heartfelt thank you.

And how about others? Are you using any products—most especially software—that you could recommend to other users? I/O News is the proper forum for sharing. Please let us know.

MUG (Microcomputer Users' Group), serving users in South Jersey, Philly and Delaware, held another technical info-sharing. This time centered around Cromemco board products such as the OCTART, SMD Hard Disk Interface, SDD Color Digitizer, and FFP Fast Floating-Point Co-Processor. New opportunities for those interested in applications programming classes were also discussed.

North Texas Cromemco Users' Group reported some very welcome guests at its February meeting in the persons of Dr. Harry Garland, President and Co-Founder of Cromemco, Len Rothman, Southern District Sales Manager, and Rick Dhaenens, District Technical Support Manager. The program for the meeting was presented by On-Line Data, Inc., and consisted of multi-user graphics via the Cromemco System One, DEC VT-100 with VT-640 Retrographics, and the Hawley Digital Mouse.

32K Classroom

32K Classroom is a regular column aimed at explaining some programming techniques using 32K Structured BASIC. The main emphasis is on "how to" with sceondary emphasis on coding effectiveness. 32K Classroom is edited by Michael Turnage, President of Turnage & Turnage, Ltd., a software development company in Sunnymead, California.

Editors' note:

The two articles printed herein were ones we found to be both interesting and useful. The first article was submitted by Robert Brown, Jr., and provides some insights into using procedures in 32K Structured BASIC. The second article was submitted by Bernie Thomas, and concerns the use of KSAM in 32K Structured BASIC. Readers are encouraged to submit articles of their own, and thereby share their own experiences and insights with other interested members. Bill Jaenicke, Technical Editor.

A METHOD: USING PROCEDURES TO CONTROL CURSOR FUNCTIONS

Contributed by: Robert Brown, Jr., 1327 Louisiana, Vallejo, CA 94590

When using cursor commands in 32K Structured BASIC, I have seen many different methods. The most common is to utilize the PRINT statement with the actual cursor command code. In a program, one would see:

```
250  Print Chr$(27); "E"
```

This is the cursor command to the 3102 terminal to clear the screen. Others have become more sophisticated and put statements such as these:

```
10  Clr'scr$ = Chr$(27) + "E"
20  Bell$ = Chr$(7)
30  Pos$ = Chr$(27) + "Y" +
    Chr$(Y+31) + Chr$(X+31)
40  Rem Y is the vertical spacing and X is the horizontal
    spacing.
```

at the start of their programs. This enables the use of statements such as:

```
270  Print Bell$
280  Print Clr'scr$
290  X = 20: Y = 4
300  Print Pos$
```

With Structured BASIC, I feel that there is a third method which results in programs which are easier to change, are more compact, and which allow the use of multiple terminals (of different types) in the system. For programmers who market their product, it makes "rewriting" the programs for different terminals very easy.

The method is to use the library function with Procedure calls. In my example, lines 270-300, could be replaced with the equivalent procedure calls:

```
270  .Bell
280  .Clear
290  .Pos (20,4)
```

A program with a formatted screen input might look like this:

```
400  .Pos (2,4) : @ "Address"
410  .Pos (2,6) : @ "Phone"
420  .Pos (10,4) : @ "....."
430  .Pos (10,6) : @ "....."
440  .Pos (9,4) : Input Address$
450  .Pos (9,6) : Input Phone$
```

The output would be:

```
Address ?.....
Phone .....
```

How does one set this up? First, we must write a program called CURSOR.SAV (or whatever). It would be as follows:

```
10  Procedure .Clear
20  Print Chr$(27);"E"
30  Endproc
40  Procedure .Bell
50  Print Chr$(7);
60  Endproc
70  Procedure .Pos (X,Y)
80  X = Int(X) : Y = Int(Y)
90  REM You can place limits
    such as
100 REM 0 ô X ô 80 and 0 ô Y ô
    24
110 Print Chr$(27); "Y"; Chr$
    (Y+31); Chr$(X+31);
120 Endproc
```

Using the library building program (LIBBUILD.LIS), we can create a library called CURSOR.LIB. Now, by simply adding one line to your program:

```
Library "cursor.lib"
```

these cursor commands are made available. This same library can be used for all of your programs. If you have a different terminal, simply make the appropriate changes in the library, CURSOR.LIB, and ALL of your programs will reflect the change. If you need to access other libraries, you can LOCK the information contained here into another partition and then close the library, CURSOR.LIB, enabling the program to load another library.

For those who are ambitious, or use a large number of cursor commands, try some of these:

```
.Eol   [End of line clear]
.Eos   [End of screen clear]
.Rhiv (X,Y)  [Reverse half intensity video at X,Y]
.Nv (X,Y)  (Normal video at X,Y]
.Lock (Y)  (Lock screen, line Y and above]
.Lock'line (Y)  [Lock line Y)
```

and as many other variations as needed. I have a number of small libraries with various cursor commands, and I load each library as I need it.

SOME OBERSVATIONS ON USING KSAM IN 32K STRUCTURED BASIC

Contributed by: Bernie M. Thomas, EDPM, Jakes Manufacturing Corp. P.O. Box 37202, Nashville, TN 37202

I have been using KSAM for over three years, and have not had ANY problems. At least none that were not self-inflicted. Anyone who has tried KSAM and been disappointed, may have suffered the same self-inflicted problems.

Before I get into these problems, however, let me extol the virtues of KSAM for those 32K BASIC users who have not tried it. For the sake of illustration, let's suppose we have a mailing list of 2000 names in an ORDINARY DATA FILE, and that these names were input at random. Each record is 102 bytes in length: 30 bytes for the name, 30 bytes for the address, 20 bytes for the city, 2 bytes for the state abbreviation, 10 bytes for the zip code, and 10 bytes

Continued on page 44

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32K Classroom

Continued from page 38

for the area code and phone number.

First of all, there is no logical relation between the record and the record number. Since the records were input at random they are not in alphabetical order, and the zip codes and area codes are not in any numerical sequence. To find a particular name, you would have to access the file sequentially until the name was found. Suppose you wanted a listing alphabetically, or as necessary for bulk mailing, a list by ascending zip code. All of this is possible, as you know, but it does require quite a bit of programming.

KSAM, however, does it all for you. You can access a file DIRECTLY by name, not record number, and the actual order of the file will be in ALPHABETICAL order, so long as you have used the name as the KEY. You can KCREATE a file using the zip code AND the name as the key, and you have a listing in ascending order by zip code and alphabetical by name within the same zip code. By using the ALTERNATE file feature you can directly access records which have unique fields. KSAM also prevents duplications since two like keys cannot be used in the same file.

The first of the self-inflicted problems which I mentioned is the most disastrous, and is only possible in a multi-user situation. It occurs when two or more users try to ALTER a file at the same time. By alter, I mean ADD or UPDATE. Any number of users may access a file at the same time, but safeguards MUST be taken to prevent more than one user ADDING or UPDATING a file at the same time. I had this happen to me twice when I first began using KSAM, and I was never able to successfully reconstruct either file.

Several errors are created when the situation mentioned above occurs. First, two or more of the same records appear in the file, which is normally not possible in KSAM. Secondly, premature ERROR 163's (end of file) are reported when the file is accessed sequentially using the KGETFWD instruction. I spent many, many hours trying to reconstruct one of the files lost in this manner, but it was useless. All of my programs are now written with a "busy signal" routine which prevents this from occurring. I also stay "backed up." Since taking these precautions I have not been troubled with this type of problem.

The next problem you may encounter occurs as a result of incorrectly dimensioning variables. If, as mentioned above, you use the 30 byte name as the KEY to a record, then you must remember one important rule. Needless to say, you must first DIM NAMR$(29), but when using Name$ as the key you MUST refer to it as NAME$(-1).
For example: Kgetkey\1,Name$ $(-1)\Add$,City$,State$,Zip$, Phone$

Unless Name$ has been dimensioned correctly AND Name$(-1) is used, you will get an ERROR 144 — KEY LENGTH. In my 32K manual, this error is not mentioned as one of the possible errors on the page which discusses the KGETKEY instruction, but it is listed as one of the Basic Error Messages in the back of the manual. I reported this to Cromemco several years ago, and I hope it was added to the appropriate pages. The Name$(-1) is NOT necessary in the KGETAPP (Read Approximate) instruction. Just Name$ will do. Incidentally, this instruction is another tremendous program time saver when you are looking for a name that you can't spell correctly.

The next problem is also a dimensioning one. When KADDing records which have fields that vary in length, and therefore aren't always as long as their allotted space, YOU MUST USE THE (-1).

You are in trouble if you say, for example:

```
Kadd\1,Name$(-1)\Add$,City$,
State$,Zip$,Phone$
```

You MUST say:

```
Kadd\1,Name$(-1)\Add$(-1),
City$(-1),State$(-1),Zip$(-1),
Phone$(-1)
```

If the (-1) is not used, the strings are not placed correctly in the record, therefore not gotten back correctly when you use the KGET instructions. It would have been nice if KSAM had been written to assume the (-1), but it wasn't. I have worn out two 32K manuals, and I can't recall vever seeing anything which even hinted to this necessity. The (-1) is not necessary in the case of Phone$ if it always includes the area code and seven digit number, but I have found it safer to always use the (-1).

The only other problem I have ever had with KSAM is the ERROR 170 — Primary Key Set Full. This occurs when, because of a combination of the Key Length, the Record Length, and the Number of Record, the key set is full. You can temporarily correct the situation by closing the file and compacting it using the KSAMUT Utility. You can also change the number of pages per key block by changing the System 12 status. This is not recommended, however, as each time you increment it by one, 256 more bytes of RAM memory is required to open the file.

I have overcome this problem by keeping the size of my files well below the "full" level. If, for example, the Mailing List contained 20,000 names instead of 2,000, I would have the list in 26 files: Mailista.dat, Mailistb.dat,..., Mailistz.dat. This not only solves the problem of the Key Set becoming full, but it also speeds things up, as smaller files are handled much faster than larger ones. You can determine the correct file to KOPEN in program mode by routines such as:

```
File$ = "Mailist" + Name$(0,0) +
"dat"
Kopen\1\File$
```

At present, I have well over 100 KSAM files being accessed, added to, updated, and deleted many times a day by eight users. We do have some problems, but KSAM is not one of them. The ONLY complaint I still have with KSAM is the manual, which leaves more than just a lot to be desired.

As a biographical note, Mr. Thomas writes:

"I have been programming in 32K Structured BASIC since January of 1981. Programs which I have written for the company include Purchasing, Inventory Control, Order Entry, Product Cost Analysis, Bills of Materials, Mailing, Payroll, Engineering, Sales, and Sales Analysis."

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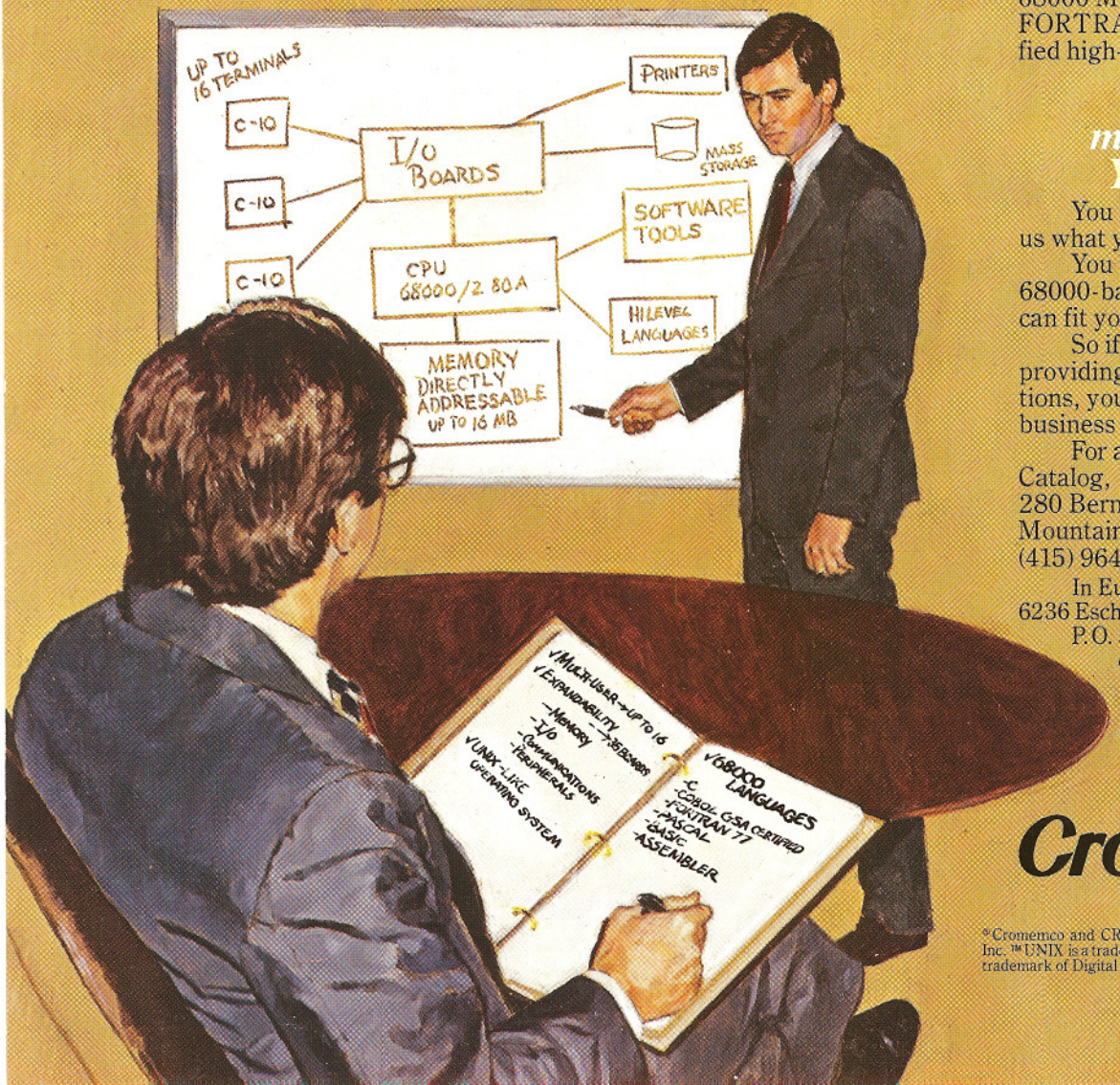

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